Trouble filling networking job vacancies? Users like Scott Miller say forget recruiters and check out trade shows. Page 8

Don't get [illegible] with the wrong [illegible] The Internet page [illegible]

COMPUTERWORLD

The Newsweekly for Information Technology Leaders
News updates, features, forums: www.computerworld.com
February 10, 1997 • Vol. 31 • No. 6 • 124 pages • $3/Copy $48/Year

Microsoft eyes server apps

By Sharon Gaudin

> "[Microsoft is] getting the tools aligned to support an Internet push."
> – Evan Quinn, IDC

IN A SHARP and pragmatic turn that could cut user PC costs, Microsoft Corp. is shifting its application development focus from the desktop to the server.

Microsoft last week released Version 5.0 of its popular Visual Basic development tool with an eye toward creating applications that sit on the server — instead of the client — and helping firms cut the total cost of PC ownership. Visual Basic 5.0 can also build desktop applications.

"You'd have to have your head buried in the sand not to hear the words 'cost of ownership,'" said Judith Hurwitz, president of Hurwitz Group, Inc. in Newton, Mass. "If [Microsoft is] going to continue expanding in the marketplace, they're going to have to expand on the server side. They have to move up the food chain."

The lure of server-based applications is that companies would have to install and maintain only one server application instead of multiple client applications. That is the argument Microsoft rivals Oracle

Visual Basic, page 17

Data theft from the inside. Hacks from the outside. **Viruses. Encryption.** It's getting crowded under the security umbrella. This week, eavesdrop on an **IS security review.** Learn how to safeguard information assets and fend off viruses. Scope out career paths. **Our Special Report starts on page 65.**

Early users tout NC benefits

By Randy Weston
and April Jacobs

EARLY ADOPTERS of network computers find them to be an effective way to wean users off mainframe terminals in favor of thin clients.

They also predict that the emerging class of desktop systems will help the bottom line by letting their companies cut maintenance costs, centralize support and, in some cases, recycle older equipment they otherwise would toss out.

"We were able to keep our investment in PCs from years past," said Karl Gouverneur, director of technology architecture at Uarco, Inc. in Barrington, Ill.

Network computers, page 16

Newly candid IRS has year 2000 fix, mulls outsourcing

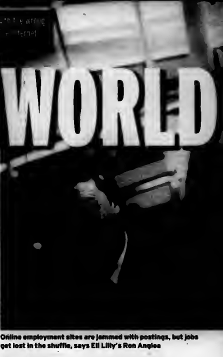
By Sharon Machlis

THE LATEST PLAN by the IRS to cope with its well-publicized technology woes would replace some aging systems in the short term and outsource tax return data entry in the long term.

The most pressing problems the Internal Revenue Service faces are that its data-entry systems are so old that replacement parts aren't available and year 2000 compliance for the existing system is impossible.

The agency displayed new

IRS, page 103



LARRY LADIG

Online employment sites are jammed with postings, but jobs get lost in the shuffle, says Eli Lilly's Ron Anglea

IS: Point-and-click recruiting falls short

By Julia King

INTERNET RECRUITING, frequently hyped as a silver bullet in today's excruciatingly tight job market, has missed the mark despite its enormous popularity.

As of last month, the number of resumes online hit 1 million, according to Internet Business Network, a consultancy in Mill Valley, Calif., that tracks Internet recruitment statistics. On the flip side, more than 1.2 million openings — about 60% of them IS-related — were posted to 3,500 employment sites on the World Wide Web.

So hiring should be a snap, right?

Wrong. Despite the avalanche of resumes and jobs online, the Internet hasn't been able to deliver on its promise of quickly and cheaply matching experienced information systems professionals with companies desperate to hire them.

Recruiting, page 24

INSIDE THIS ISSUE

NEWSPAPER

UP FRONT

Feeling insecure

Several years ago, my company was the victim of an embarrassing and expensive phone phreak attack. Hackers broke in to a private branch exchange in New Hampshire and used it to make tens of thousands of dollars worth of international calls. The entrepreneurial felons apparently even ran a small business selling long-distance access via our hijacked switch. The story made *The New York Times*, and we learned about the consequences of inadequate security.

Let's hope the same thing doesn't happen to you. As this week's special report on security (beginning on page 65) points out, our computer networks are becoming more vulnerable. Distributed networks have made every workstation that runs remote-control software a gateway into corporate networks.

And we're sending our security problems on the road. Millions of travelers carry laptops that contain access numbers and log-in information. Windows 95 even has a feature that lets you store log-ons and passwords in your dial-up profiles. How convenient for the laptop thief!

We're opening our networks to the outside world. Hybrid internal/external "extranets" give customers (or whomever) access to our core systems. Data travels unencrypted over public networks. As columnist John Gantz pointed out last week in *Computerworld*, electronic commerce is ready to explode. But the best Internet security products of our smartest scientists are still thwarted by 16-year-old hackers from Holland.

This isn't a call for hand-wringing. Distributed networks are a positive step in the evolution of computing. But the risks are mounting, and it's incumbent on IS organizations to be the bad guys in enforcing strict procedures within their companies. The opportunity cost of poor security is just too high.

Paul Gillin, *Editor*
Internet: *paul_gillin@cw.com*

THE FIFTH WAVE
BY RICH TENNANT

SEVERAL HOURS PASSED BEFORE WAYNE DISCOVERED THAT HE WAS LOOKING AT HIS SCREEN SAVER AND NOT OUT THE SUBMARINE'S PORTHOLE
"IT'S INCREDIBLE! I'M SEEING LIFE FORMS NEVER BEFORE IMAGINED!! BIZARRE, COLORFUL, ALMOST WHIMSICAL!!!"

E-mail Rich Tennant at the5wave@tiac.net

www.domains.expand

▸ *Users stand behind plan for seven new Internet categories*

By Mitch Wagner and Stewart Deck

USERS LAST WEEK expressed support for a proposal to expand the traditional top-level Internet domains of .com, .org. and .net to include as many as seven new suffixes for Internet addresses.

The proposal could make it easier for Internet users to find information on the Internet and for organizations to proclaim the nature of their businesses online. It could also eliminate the clashes that occur when companies and individuals fight over domain names, some users said.

The new domains would also make it easier for companies to restrict employees' access to some Internet sites.

But the proposal has potential pitfalls, some information systems managers said. Users might find the new domains confusing. And the plan might never catch on if organizations can't be persuaded to use the new top-level domains.

Last week, an industry consortium recommended the new domains (see chart). The consortium, called the International Ad Hoc Committee, is affiliated with the Internet Society, which sets technical standards for the Internet.

WHAT'S IN A NAME?

The goal is to reduce the shortage of names on the Internet and make the 'net easier to navigate. In the real world, companies often have the same name if they are in different businesses — Apple Records and Apple Computer Inc., for instance. But on the Internet, only one company can be apple.com. Under the new plan, there would be less conflict — the computer company might be apple.firm, and the record company might be apple.rec (.rec for a recreation and entertainment site) or apple.arts.

The next step for the committee is to win support from Network Solutions, Inc., which has a U.S. government-granted monopoly on dishing out domain names, and from the National Science Foundation, which oversees the process. If the plan clears that hurdle, it must then win out in the marketplace. Internet addresses aren't forced on users; users must agree to accept them.

Mark Nacke, a project leader at Indiana Power & Light Co. in Indianapolis, said the proposed domain names will make it easier for the company to enforce policies on Internet usage.

"It could make restrictions easier," Nacke said. For instance, his company doesn't allow its employees to make purchases online, a restriction that would be strengthened by blocking access to the .store domain.

QUESTIONING SUPPORT

Analyst Ezra Gottheil at Hurwitz Group, Inc. in Newton, Mass., questioned whether the proposal will actually win support from the Internet community at large.

But if many users are like Bobby Chowdhury, vice president of technology at United Media in New York, winning support for the proposal won't be a problem.

"I think it's a very cool idea. Instead of going to a home page at 'dot·com' and then hunting through an index to find something, you could just go directly to the right place," he said.

THE NAME GAME

In addition to the familiar .com, .org and .net domains, the plan would add:

Domain	Area
.firm	Businesses
.store	Businesses offering sales
.web	Activities related to the Web
.arts	Culture and entertainment
.rec	Recreation and entertainment
.info	Entities providing information services
.nom	Individuals, families and other informal groups who want their own domain

Judgment calls

The proposed plan for a new Internet domain structure includes a proposal for solving trademark disputes online.

The Ad Hoc Committee's solution is to require companies that register domains to agree to binding arbitration if a trademark dispute occurs.)

In the real world, companies in different lines of business can have the same name, but the companies often butt heads when they both try to register the same domain on the Internet.

The conflicts often result in litigation. Hasbro, Inc. won a court injunction blocking a pornography site from using the domain name candyland.com. And sometimes firms pay tens of thousands of dollars to buy domain names from their owners.

"I have a friend who has a small company that owns the domain www.internet.com," said Hurwitz Group analyst Ezra Gottheil. "They have four products. When he told someone about the domain name, he was told, 'No, you have five products.'"

Come visit our Web site @ Computerworld

- CW AUDIO. Security — it's the issue that will make or break Internet-based commerce. Editor Paul Gillin and Executive Editor Maryfran Johnson debate the future of commerce over the 'net. (www.computerworld.com)
- GETTING 'DISCOVERED' ON THE 'NET. IS pros with the right skills are showing them off on the Web, getting noticed and fulfilling their entrepreneurial dreams. (www.computerworld.com/careers)

Daily news updates: (800) 340-2262

- If you used to know what's going on in the industry but aren't near your PC, call the *Computerworld* phone line.

GroupWise upgrade angers users

▸ *Document management features are lacking*

By Barb Cole

NOVELL, INC. plans a slew of document management improvements for its GroupWise messaging and groupware system by year's end. But users are anything but jubilant.

More than 30 angry users recently met in Chicago and complained that they lost many document management capabilities in the transition from GroupWise 4.1 to 5.0 and that Novell has been slow to fill the gap.

Users said they are still waiting for the company to incorporate into GroupWise many of the choicest features of the SoftSolutions Document Management System, a stand-alone application that was melded into GroupWise last year.

GroupWise 5.0 was to be the upgrade path for companies that use SoftSolutions, which Novell picked up in its 1994 acquisition of WordPerfect Corp.

"We expected to see [those enhancements] by now and are being told they won't show up until the end of year," said an information systems manager, who asked not to be named, at a Midwestern law firm. The firm uses SoftSolutions but has resisted a move to GroupWise 5.0.

ENHANCEMENTS

The enhancements on tap include the ability to store documents on a local hard drive so they are available if the GroupWise Post Office is down, improved integration with other applications and the ability to store documents in native file formats.

"Novell has lost a lot of upgrade business due to this," said Greg Arnette, a senior consultant for messaging services at Synaxis Corp., a consultancy in Needham, Mass.

Novell officials acknowledged that they have yet to satisfy the SoftSolutions camp, which is estimated at about 300,000 users.

"[SoftSolutions] users don't agree with our prioritization," said Eldon Greenwood, director of product management at Novell. He was referring to the company's decision to put Internet Protocol support in front of the document management features.

"We're looking at the market and seeing that if we're not a significant player in the Internet space by the middle of the year, we'll have bigger problems [than some angry users]," Greenwood said.

GROUPWISE ENHANCEMENTS

- [illegible]
- [illegible]
- [illegible]
- [illegible] to other locations

& HP repositions OpenMail to bolster E-mail networks. Page 47

PENTIUM CHIP PRICING

Speed	Cache	Price
[illegible]	[illegible]	[illegible]

Users give new Intel chip a cool reception

By April Jacobs

INTEL CORP. previewed its 300-MHz Pentium Pro processor late last week, but mainstream users said they don't see an imminent need for that much speed on the desktop.

MULTIMEDIA TECHNOLOGY

Intel, in Santa Clara, Calif., demonstrated the 300-MHz chip at the International Solid-State Circuits Conference in San Francisco. The chip is based on a new architecture, code-named Klamath. But the technology isn't expected to hit the street any time soon, according to Intel sources and analysts.

The chip will support MMX technology, making it multimedia-friendly, and it is expected to be less expensive than existing Pentium Pro processors, the sources said.

But corporate users don't appear even close to Intel's high-speed vision. Several said they still use 100-MHz Pentiums on their desktops.

"Most people aren't doing serious number-crunching and just don't need that much power on the desktop," said one information systems manager at a major U.S. insurance company.

"Right now, we're just trying to get everyone on the same page and standardize on [Windows] NT," said the manager, who requested anonymity. He noted that most of his company's PCs are in the 100- to 120-MHz range.

Dan Vermeire, vice president of applied technologies at Huntington Bancshares Corp. in Columbus, Ohio, echoed those sentiments. "Generally, new machines will be Pentium 120s, but we haven't really seen the need for Pentium Pros" on the desktop, he said.

Intel is likely to first offer the Klamath chip at lower speeds — 233 to 266 MHz — later this year, according to Dean McCarron, an analyst at Mercury Research, Inc. in Phoenix.

"This is going to show up in high-end corporate desktops and in single- or dual-processing server systems," McCarron said. He said pricing is expected to be about $3,000 for a complete system.

IBM plans to pump up data mart suite

By Craig Stedman

TAKING A little-acorns-into-large-oaks approach, IBM plans to scale up its integrated data mart suite in the next few months so users can use it to build and manage full-fledged data warehouses.

Like similar bundles that emerged last year from Sybase, Inc. and others, IBM's Visual Warehouse handles only small-scale data marts, which hold a subset of a company's historical information or are designed for individual departments. IBM recommends that data marts be less than 70G bytes.

But IBM will add data-loading agents to Visual Warehouse, which will eliminate its size constraints and let it scale to the terabyte range, said George Zaglow, a business intelligence segment manager at IBM.

New Unix, AS/400 and OS/2 releases are due by May, and a mainframe version will follow in the second half of the year, Zaglow said.

If Visual Warehouse can be beefed up, its integrated tool set might reduce the "constant" software integration and management headaches that are common on big data warehouse projects, said Mick Haney, a technical services analyst at Hallmark Cards, Inc. in Kansas City, Mo. Tying together different warehouse tools "is a major undertaking," he added.

And tools that handle large warehouses are also "still very high-end and expensive," said Theresa Wingfield, an analyst at Giga Information Group in Cambridge, Mass.

By contrast, pricing for data mart suites starts at less than $100,000. Pricing for the scalable Visual Warehouse hasn't been finalized, Zaglow said.

UP FRONT

Feeling insecure

Several years ago, my company was the victim of an embarrassing and expensive phone phreak attack. Hackers broke in to a private branch exchange in New Hampshire and used it to make tens of thousands of dollars worth of international calls. The entrepreneurial felons apparently even ran a small business selling long-distance access via our hijacked switch. The story made *The New York Times*, and we learned about the consequences of inadequate security.

Let's hope the same thing doesn't happen to you. As this week's special report on security (beginning on page 65) points out, our computer networks are becoming more vulnerable. Distributed networks have made every workstation that runs remote-control software a gateway into corporate networks.

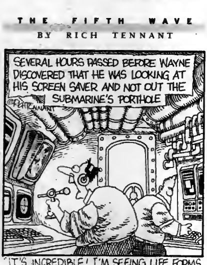
And we're sending our security problems on the road. Millions of travelers carry laptops that contain access numbers and log-in information. Windows 95 even has a feature that lets you store log-ons and passwords in your dial-up profiles. How convenient for the laptop thief!

We're opening our networks to the outside world. Hybrid internal/external "extranets" give customers (or whomever) access to our core systems. Data travels unencrypted over public networks. As columnist John Gantz pointed out last week in *Computerworld*, electronic commerce is ready to explode. But the best Internet security products of our smartest scientists are still thwarted by 16-year-old hackers from Holland.

This isn't a call for hand-wringing. Distributed networks are a positive step in the evolution of computing. But the risks are mounting, and it's incumbent on IS organizations to be the bad guys in enforcing strict procedures within their companies. The opportunity cost of poor security is just too high.

Paul Gillin, *Editor*
Internet: *paul_gillin@cw.com*

THE FIFTH WAVE
BY RICH TENNANT


SEVERAL HOURS PASSED BEFORE WAYNE DISCOVERED THAT HE WAS LOOKING AT HIS SCREEN SAVER AND NOT OUT THE SUBMARINE'S PORTHOLE
©RICHTENNANT

"IT'S INCREDIBLE! I'M SEEING LIFE FORMS NEVER BEFORE IMAGINED!! BIZARRE, COLORFUL, ALMOST WHIMSICAL!!!"

E-mail Rich Tennant at the5wave@tiac.net

www.domains.expand

▸ *Users stand behind plan for seven new Internet categories*

By Mitch Wagner and Stewart Deck

USERS LAST WEEK expressed support for a proposal to expand the traditional top-level Internet domains of com, org, and net to include as many as seven new suffixes for Internet addresses.

The proposal could make it easier for Internet users to find information on the Internet and for organizations to proclaim the nature of their businesses online. It could also eliminate the clashes that occur when companies and individuals fight over domain names, some users said.

The new domains would also make it easier for companies to restrict employees' access to some Internet sites.

But the proposal has potential pitfalls, some information systems managers said. Users might find the new domains confusing. And the plan might never catch on if organizations can't be persuaded to use the new top-level domains.

Last week, an industry consortium recommended the new domains (see chart). The consortium, called the International Ad Hoc Committee, is affiliated with the Internet Society, which sets technical standards for the Internet.

WHAT'S IN A NAME?

The goal is to reduce the shortage of names on the Internet and make the net easier to navigate. In the real world, companies often have the same name if they are in different businesses — Apple Records and Apple Computer Inc., for instance. But on the Internet, only one company can be apple.com. Under the new plan, there would be less conflict — the computer company might be apple.firm, and the record company might be apple.rec (.rec for a recreation and entertainment site) or apple.arts.

The next step for the committee is to win support from Network Solutions, Inc. which has a U.S. government-granted monopoly on dishing out domain names, and from the National Science Foundation, which oversees the process. If the plan clears that hurdle, it must then win out in the marketplace. Internet addresses aren't forced on users; users must agree to accept them.

Mark Nacke, a project leader at Indiana Power & Light Co. in Indianapolis, said the proposed domain names will make it easier for the company to enforce policies on Internet usage.

"It could make restrictions easier," Nacke said. For instance, his company doesn't allow its employees to make purchases online, a restriction that would be strengthened by blocking access to the .store domain.

QUESTIONING SUPPORT

Analyst Ezra Gottheil at Hurwitz Group, Inc. in Newton, Mass., questioned whether the proposal will actually win support from the Internet community at large.

But if many users are like Bobby Chowdhury, vice president of technology at United Media in New York, winning support for the proposal won't be a problem.

"I think it's a very cool idea. Instead of going to a home page at 'dot-com' and then hunting through an index to find something, you could just go directly to the right place," he said.

THE NAME GAME

In addition to the familiar .com, .edu and .net domains, the plan would add:

Domain	Area
.firm	Businesses
.store	Businesses offering sales
.web	Activities related to the Web
.arts	Culture and entertainment
.rec	Recreation and entertainment
.info	Entities providing information services
.nom	Individuals, families and other informal groups who want their own domain

Judgment calls

The proposed plan for a new Internet domain structure includes a proposal for solving trademark disputes online.

The Ad Hoc Committee's solution is to require companies that register domains to agree to binding arbitration if a trademark dispute occurs.

In the real world, companies in different lines of business can have the same name, but the companies often butt heads when they both try to register the same domain on the Internet.

The conflicts often result in litigation. Hasbro, Inc. won a court injunction blocking a pornography site from using the domain name candyland.com. And sometimes firms pay tens of thousands of dollars to buy domain names from their owners.

"I have a friend who has a small company that owns the domain www.internet.com," said Hurwitz Group analyst Ezra Gottheil. "They have four products. When he told someone about the domain name, he was told, 'No, you have five products.'"

Come visit our Web site @ Computerworld

- **CW AUDIO. Security — it's the issue that will make or break Internet-based commerce. Editor Paul Gillin and Executive Editor Maryfran Johnson debate the future of commerce over the 'net. (www.computerworld.com)**
- **GETTING 'DISCOVERED' ON THE 'NET. IS pros with the right skills are showing them off on the Web, getting noticed and fulfilling their entrepreneurial dreams. (www.computerworld.com/careers)**

Daily news updates: (800) 340-2262

- **If you need to know what's going on in the industry but aren't near your PC, call the *Computerworld* phone line.**

GroupWise upgrade angers users

▸ *Document management features are lacking*

By Barb Cole

NOVELL, INC. plans a slew of document management improvements for its GroupWise messaging and groupware system by year's end. But users are anything but jubilant.

More than 30 angry users recently met in Chicago and complained that they lost many document management capabilities in the transition from GroupWise 4.1 to 5.0 and that Novell has been slow to fill the gap.

Users said they are still waiting for the company to incorporate into GroupWise many of the choicest features of the SoftSolutions Document Management System, a stand-alone application that was melded into GroupWise last year.

GroupWise 5.0 was to be the upgrade path for companies that use SoftSolutions, which Novell picked up in its 1994 acquisition of WordPerfect Corp.

"We expected to see [those enhancements] by now and are being told they won't show up until the end of year," said an information systems manager, who asked not to be named, at a Midwestern law firm. The firm uses SoftSolutions but has resisted a move to GroupWise 5.0.

ENHANCEMENTS

The enhancements on tap include the ability to store documents on a local hard drive so they are available if the GroupWise Post Office is down, improved integration with other applications and the ability to store documents in native file formats.

"Novell has lost a lot of upgrade business due to this," said Greg Arnette, a senior consultant for messaging services at Synaxis Corp., a consultancy in Needham, Mass.

Novell officials acknowledged that they have yet to satisfy the SoftSolutions camp, which is estimated at about 300,000 users.

"[SoftSolutions] users don't agree with our prioritization," said Eldon Greenwood, director of product management at Novell. He was referring to the company's decision to put Internet Protocol support in front of the document management features.

"We're looking at the market and seeing that if we're not a significant player in the Internet space by the middle of the year, we'll have bigger problems [than some angry users]," Greenwood said.

GROUPWISE ENHANCEMENTS

- Better application integration
- Ability to store documents in their native formats
- Support for user-defined archive location
- Ability to replicate documents to other locations

& HP repositions OpenMail to bolster E-mail networks. Page 47

PENTIUM CHIP PRICING

Speed	Cache	Price
200 MHz	512K	$1,035
166 MHz	512K	$627
200 MHz	256K	$525
180 MHz	256K	$418

Users give new Intel chip a cool reception

By April Jacobs

INTEL CORP. previewed its 300-MHz Pentium Pro processor late last week, but mainstream users said they don't see an imminent need for that much speed on the desktop.

Intel, in Santa Clara, Calif., demonstrated the 300-MHz chip at the International Solid-State Circuits Conference in San Francisco. The chip is based on a new architecture, code-named Klamath. But the technology isn't expected to hit the street any time soon, according to Intel sources and analysts.

MULTIMEDIA TECHNOLOGY

The chip will support MMX technology, making it multimedia-friendly, and it is expected to be less expensive than existing Pentium Pro processors, the sources said.

But corporate users don't appear even close to Intel's high-speed vision. Several said they still use 100-MHz Pentiums on their desktops.

"Most people aren't doing serious number-crunching and just don't need that much power on the desktop," said one information systems manager at a major U.S. insurance company.

"Right now, we're just trying to get everyone on the same page and standardize on [Windows] NT," said the manager, who requested anonymity. He noted that most of his company's PCs are in the 100- to 120-MHz range.

Dan Vermeire, vice president of applied technologies at Huntington Bancshares Corp. in Columbus, Ohio, echoed those sentiments. "Generally, new machines will be Pentium 120s, but we haven't really seen the need for Pentium Pros" on the desktop, he said.

Intel is likely to first offer the Klamath chip at lower speeds — 233 to 266 MHz — later this year, according to Dean McCarron, an analyst at Mercury Research, Inc. in Phoenix.

"This is going to show up in high-end corporate desktops and in single- or dual-processing server systems," McCarron said. He said pricing is expected to be about $3,000 for a complete system.

IBM plans to pump up data mart suite

By Craig Stedman

TAKING A little-acorns-into-large-oaks approach, IBM plans to scale up its integrated data mart suite in the next few months so users can use it to build and manage full-fledged data warehouses.

Like similar bundles that emerged last year from Sybase, Inc. and others, IBM's Visual Warehouse handles only small-scale data marts, which hold a subset of a company's historical information or are designed for individual departments. IBM recommends that data marts be less than 70G bytes.

But IBM will add data-loading agents to Visual Warehouse, which will eliminate its size constraints and let it scale to the terabyte range, said George Zaglow, a business intelligence segment manager at IBM.

New Unix, AS/400 and OS/2 releases are due by May, and a mainframe version will follow in the second half of the year, Zaglow said.

If Visual Warehouse can be beefed up, its integrated tool set might reduce the "constant" software integration and management headaches that are common on big data warehouse projects, said Mick Haney, a technical services analyst at Hallmark Cards, Inc. in Kansas City, Mo. Tying together different warehouse tools "is a major undertaking," he added.

And tools that handle large warehouses are also "still very high-end and expensive," said Theresa Wingfield, an analyst at Giga Information Group in Cambridge, Mass.

By contrast, pricing for data mart suites starts at less than $100,000. Pricing for the scalable Visual Warehouse hasn't been finalized, Zaglow said.

Sequent tackles mighty mainframe

BETA TESTERS such as the National Association of Security Dealers' Sam Laughery say Sequent Computer Systems, Inc.'s new 12-processor NUMA-Q server outpaces the vendor's previous models. But can any Intel-based system — even one that might eventually scale to 252 processors — really compete with mainframes? And can Sequent stay far enough ahead of its competition to justify prices that start at $250,000?

NASD's Sam Laughery also wants fail over capabili

Get the answers from users who have put the machines through their paces. Servers & PCs, page 39

[illegible]: Tools, rules and documentation can save the day when techie gurus take other jobs, Frank Hayes writes, page 43

MAPPING RESOURCES? Newark, N.J., surveyor Donald Forbes says a GIS network will save the city money. Corporate Strategies, page 57

GIVE THEM A CHANCE: Merrill Lynch's Howard Sorgen explains how to retain the hottest IS talent. Corporate Strategies, page 57

In this issue

NEWS

6 **Defending Unix**
Vendors move to shore up Unix's spot as the high-end applications server of choice.

8 **Hiring frenzy**
LAN/WAN convergence makes skilled networkers hot but hard to find.

10 **Enhancing host management**
Sterling tool extends management of mainframes to client/server networks.

12 **Almost standard**
HP joins the crowd backing Rmon 2 but continues to offer proprietary tweaks.

14 **Flying failure**
IT flops undermine FAA's effort to upgrade air traffic control systems.

20 **Airline migration**
Air France flies part of host-based reservation system to Unix.

OPINION

32 **Taxing situation**
The IRS fiasco is a warning against a Big Bang approach to modernization, Michael Goldberg avers.

105 **Who are you?**
On the Internet, everybody should know if you're a dog, stalker, smuggler or con artist, David Coursey writes.

TECHNICAL SECTIONS

SERVERS & PCs

39 **Entry-level mainframe**
Low-cost, low-maintenance mainframe provides alternative to Unix.

40 **Scalability**
IBM helps S/390 users port Unix and NT applications to big iron.

SOFTWARE

43 **Packaging planning**
Oracle aims at enterprise resource planning with multivendor package.

43 **Spoof-proof**
Faux home pages help hackers intercept electronic commerce transaction data.

THE ENTERPRISE NETWORK

47 **Who needs 3-D?**
It's cool, but users are lukewarm about Unicenter TNG's three-dimensional interface.

47 **Roaming revenuers**
IRS agents use a wireless network to track down diesel fuel tax fraud.

47 **Opening mail**
HP beefs up OpenMail and pitches it as a backbone for Notes and Exchange.

THE INTERNET

51 **Filtering applets**
Firewall vendors snap up software to filter out rogue Java code.

CORPORATE STRATEGIES

57 **Bottom-line benefit**
Business reasoning, not technology, is the basis of some standards decisions.

57 **Closer look**
Risk-management tools track financial metrics but can't think of everything.

FEATURES

SPECIAL REPORT/SECURITY

66 **Exposing risks**
You may be safe against outside attack, but beware of potential enemies within.

70 **Be prepared**
CIOs must be aggressive in protecting their companies' information assets, Paul Strassmann writes.

79 **Easy access**
Vendors disable security features before shipping products.

ETC.

Company index ____ 101
Editorial/Letters ____ 32
How to contact CW/Subscriptions ____ 101
Inside Lines ____ 106
Stock Ticker ____ 99

Telecom reform fails to pay off for users

By Kim Girard

A YEAR AFTER passage of The Telecommunications Deregulation and Reform law, high hopes have been replaced by uncertainty and disappointment.

The law passed Feb. 8, 1996, with the promise that deregulation would bring increased services and lower costs.

Instead, users have seen a stream of carrier lawsuits, internal bickering among the carriers and endless Federal Communications Commission bureaucracy, making true competition seem like a distant promise.

Under the law, local and long-distance companies can compete in each other's markets, along with wireless, cable and utility companies.

NOT MUCH ACCOMPLISHED

But Michael Hewitt, telecommunications asset manager at The Dow Chemical Co. in Midland, Mich., has been underwhelmed by industrywide progress so far, comparing the telecommunications carriers to boxers in a ring.

Carriers "seem to be circling each other without actually doing anything," he said. "They are playing a defensive game rather than an offensive game. They need someone to break the logjam."

Hewitt, who uses AT&T Corp. for voice services and MCI Communications Corp. for data services, said he sees big potential savings from both companies. But that won't happen until the FCC reduces the access fees long-distance companies pay local companies to use their lines.

Hewitt also said he doesn't expect competition to affect Dow's operations for the next year or two. "It seems to be balled up right now with lawsuits," he said.

Carriers don't expect interconnection and access charge issues to be settled for quite a while. A majority of the 400 local exchange regulators and officials surveyed by financial services firm Deloitte & Touche said rules that govern pricing and interconnection rates won't be in place until 1998 or later.

The study said that since the new telecommunications law passed, local carriers have spent more money on marketing campaigns than on new technology. It also said local carriers lag in providing long-distance companies access to their networks.

Laura Ring, executive director at the Massachusetts Telecommunications Council in Boston, said she never expected drastic changes in 1996. Expectations were set too high, she said.

Ring noted that the many mergers initiated last year, including MCI's proposed deal with British Telecommunications PLC and Bell Atlantic Corp.'s planned merger with Nynex Corp., couldn't have happened without the new law. The mergers are expected to result in more bundled service options, a wider variety of services and a single point of contact for service.

WHAT'S AT STAKE

Long-distance market
$75 billion

Local market
$90 billion

Access fees paid by long-distance companies to local companies
About $30B

Portion of each dollar long-distance companies pay RBOCs for local access
45 cents

On the local front, progress has been made, Ring said. By the end of the year, MCI plans to offer switched local service in 31 markets. The company has invested $1 billion in building its own local switched networks and is far ahead of AT&T, which has concentrated its efforts on reselling services on the local loop.

Long-distance carriers blame the regional Bell operating companies (RBOC) for resisting competition on the local level and dragging out negotiations for interconnection agreements. The local carriers contend they are having a hard time understanding what is required by the new law and regulators.

In the meantime, Steven Kitchens, technology manager at First Health Services Corp., just wants less expensive frame relay.

"In the end, it's money making the difference," he said.

Take The CA Year 2000 Challenge Before It's Too Late.

Send Us Your Toughest Program And We'll Analyze It For FREE!

This special offer can be the first step you take to prepare for the biggest challenge of your career.

At Computer Associates, we've leveraged over two decades of experience in building tools for application development, maintenance and migration to create a solution for your Year 2000 problems. CA Discovery 2000 provides the only end-to-end solution for all aspects of your compliance effort, including analysis, conversion, testing and life-cycle management. And, because our impact assessment tool runs under MVS, VSE and Windows and can access all of the most popular source library formats, you can start your Year 2000 initiative today.

CA 2000™
TAKE THE CHALLENGE

Behind our CA Discovery 2000 solution stands a Professional Services team that is experienced in all aspects of Year 2000 compliance. After all, as the world's leading independent software company, we have more experience reengineering legacy apps than anybody. And with a 20-year track record of success and nearly $4 billion in revenue, our clients know we'll be around long after the Year 2000.

Datamation
1997
Product of the Year

Preparing your applications for the next century may be the most important job you've ever faced. Start now and turn the biggest challenge of your career into a triumph.

**Call us today toll-free
at 1-888-4-2000YR
or visit www.cai.com**

COMPUTER® ASSOCIATES
Software superior by design.

©1997 Computer Associates International, Inc. Islandia, NY 11788-7000. All other product names referenced herein are trademarks of their respective companies.

Unix holds high ground against NT

▸ *Vendors beef up scalability, target Internet and mainframe replacement*

By Jaikumar Vijayan and Laura DiDio

THE HIGH ground Unix holds is getting some fortification.

Recent initiatives from the top Unix vendors are shoring up the operating system on two fronts: by helping to cement Unix's lead in the high-end database and application server markets, and by extending its reach into the emerging Internet, electronic-commerce and mainframe-replacement markets.

New reports from market researchers such as International Data Corp. (IDC), Gartner Group, Inc. and Forrester Research, Inc. all concur that Microsoft Corp.'s Windows NT is mounting a successful assault on Unix workstations and low-end servers. But high-margin, high-end Unix server sales are healthy and so far are immune to NT, the reports said (see story at right).

Microsoft officials have said that the company doesn't expect to have a 64-bit version of Windows NT or have support for scalable clustering for another two years at least.

Meanwhile, "The Unix vendors are taking the 'best defense is a good offense' approach to the enterprise server market by building their value proposition," said James Greene, an analyst at Summit Strategies, Inc. in Boston.

Sun Microsystems, Inc., Hewlett-Packard Co., Silicon Graphics, Inc. (SGI) and Digital Equipment Corp. have all recently announced technologies designed to increase the scalability, reliability and transaction processing capabilities of their Unix platforms (see chart).

Those moves should give Unix a solid three- to five-year technology lead over Windows NT servers, according to 12 users and analysts contacted by *Computerworld*.

"There's no doubt that Unix holds the high ground in the enterprise server wars on every front: 64-bit processing, high-level clustering, zero downtime and excellent scalability," said Neil MacDonald, an analyst at Gartner Group in Stamford, Conn.

Users agreed. They said Unix delivers the goods now

"It's going to take Windows NT at least three years to provide the same level of functionality that Unix offers today," said Dennis Courtney, chief information officer at Dunlop Tire Corp. in Amherst, N.Y. The company has been migrating applications from its mainframes to Unix servers for the past few years.

David Krauthammer, MIS director at Parker Hannifin Corp. in Rohnert Park, Calif., agreed. "Whenever we have a database application or any application that requires high bandwidth and processing capability, Unix is really the only choice available right now," he said.

Superior processing power, proven reliability and unparalleled security are "must have" features for the burgeoning Internet and electronic commerce markets, observers said.

Because Unix fits all those criteria, the high-end server market is growing. After declining in 1995, high-end Unix server sales bounced back and registered a 5% gain last year, according to preliminary 1996 figures from IDC. Similarly, midrange Unix server revenue grew 34%, from $6.7 billion to $9 billion, IDC said.

Underscoring the trend at the high end are recent moves by Sun and SGI to incorporate interconnect technology from supercomputer vendor Cray Research, Inc. into their respective Unix servers.

The interconnect technology allows the vendors to scale their Unix servers significantly beyond current levels. For example, Sun's recently announced UltraEnterprise 1000 scales to 64 processors from a previous high of 30.

Similarly, all the top Unix vendors are following Digital's early lead and moving rapidly to 64-bit architectures with support for performance-boosting features such as Very Large Memory and large file sizes.

GOING ON THE OFFENSIVE

Traditional Unix strengths

- **Good scalability**
- **High availability/reliability**
- **Manageability**

How vendors are building on this

- **64-bit processors and 64-bit operating systems**
- **Fast, scalable interconnect technologies**
- **Very Large Memory and large file sizes**
- **High-performance clustering**
- **High bandwith I/O technologies**

Microsoft nibbles at low end

A recent crop of studies confirms that Unix has a solid hold on the high-end server market and is likely to retain it — at least in the short term.

A recent survey of 1,300 users worldwide conducted Datapro Information Services Group, Inc. in Delran, N.J., found that 31% of existing Unix users plan to expand their crop of high-end Unix servers by the year 2000.

"Unix outperforms Windows NT on the high end. For that reason, we intend to run more Unix applications and also buy more Unix servers," said Barry Flachsbart, vice president of information systems at Skyway Freight Systems, Inc. in Watsonville, Calif.

And a Forrester survey of 50 Fortune 1,000 companies found that 76% of users will buy both Unix and NT over the next two years. But only 13% of the information technology managers surveyed said they believe that NT is ready to handle their most important enterprise applications.

"IT managers said NT can't scale, is immature, unstable and lacks the tools necessary to build high-end systems," said Jon Oltsik, an analyst at Forrester.

Windows NT stars on the low end. It is starting to dominate in the workgroup and departmental server market, and NT server volume is expected to explode from 465,000 units last year to 936,000 units in 1999, according to Forrester.

— Jaikumar Vijayan and Laura DiDio

INTEGRATED APPLICATIONS

Users eye built-in decision support

By Craig Stedman

DIFFERENT PIECES of the decision-support puzzle are increasingly being snapped together into packaged suites.

SAS Institute, Inc. will further the trend this week by shipping a version of its flagship statistical software with a built-in multidimensional database for running complex business queries.

Other vendors are jumping on the same bandwagon. For example, Cognos, Inc. in Ottawa last week said it is buying U.K.-developed business forecasting software that will be combined with its query and analysis tools.

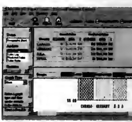
The increasing integration is a step in the right direction, according to several information systems managers who have to buy, install and support multiple point products to serve different kinds of analytical needs.

"Sometimes our users just want canned reports, but there are other times when they'd like to drill down and do some data mining," said Rob Phelps, manager of systems development at Bowmao Gray/Baptist Hospital Medical Center, an SAS customer in Winston-Salem, N.C. Doing that from one user interface would help to lower training and support costs, he said.

Until now, the hospital has had to assemble data summaries on the fly for analysis-minded users by pulling raw information from "all these separate data sets with no way to manage the process," Phelps said. The multidimensional database in SAS' new Orlando II software should streamline things by providing a ready-made location for the summaries, he said.

Multidimensional databases let users run complex queries that analyze numerous facets of a subject, such as product sales by region on a quarter-by-quarter basis. Such queries can also be done with standard relational databases, but performance may slow to a crawl, analysts said.

With the database, Orlando II costs $25,000 for a one-year license. The software supports online analytical processing (OLAP), statistical analysis and end-user reporting. SAS, in Cary, N.C., also added a World Wide Web viewer that lets browser-equipped remote users do limited analysis (see photo).



SAS' Orlando II software lets users read canned reports and create basic graphs from a Web browser

Cognos officials said the forecasting software the company is buying will become an add-on to its query and OLAP tools in six to nine months. Other decision-support vendors, such as Seagate Software in Scotts Valley, Calif., and Business Objects, Inc. in San Jose, Calif., have also announced plans to bundle multiple analysis tools.

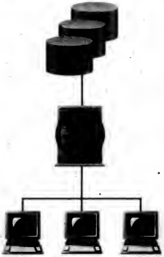
Dan Barth, chief information officer at Pinnacle Brands, Inc. in Dallas, said Cognos' plans will save him from having to buy a separate forecasting tool that would require the trading-card maker to maintain two different repositories of decision-support data.

Pinnacle's Cognos-savvy users also won't have to be retrained, Barth added. Pinnacle wants "to be able to forecast things forward rather than just looking back on what happened in the past," he said.

Oracle Parallel Server: Fault Tolerant

Oracle7 Parallel Server™ allows multiple servers to access a common pool of disks sharing the same database. With Oracle7, if one of these clustered servers should fail, the other servers carry on running the application. Neither Sybase, Microsoft, nor Informix provide this level of reliability, availability and security for your applications and data.

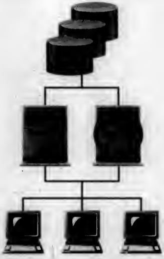
Sybase, Microsoft, Informix



Single Point of Failure

Applications built using Sybase or Microsoft allow only a single server to access data at a time; hence, if the server fails, the entire application fails.

Oracle7 Parallel Server



No Single Point of Failure

Oracle7 Parallel Server breaks the single server limit by allowing multiple servers to access a common database. If one server fails, Oracle7 allows the other server(s) to continue running your application. If reliability, availability and security are important to you, **call Oracle at 1-800-633-1071, ext. 11294, or find us on the Web at http://www.oracle.com**

ORACLE®

Enabling the Information Age™

©1997 Oracle Corporation. All rights reserved. Oracle is a registered trademark, and Oracle7 Parallel Server and Enabling the Information Age are trademarks of Oracle Corporation. All other company and product names are the trademarks of their respective owners.

SKILLS CRUNCH

What equipment? We're here to recruit

By Bob Wallace
WASHINGTON

THE CONVERGENCE of the LAN and WAN, coupled with raids on existing staff from all sides, is forcing information systems managers to adopt more aggressive tactics for hiring and retaining staff.

Nowhere was this more apparent than at last week's ComNet show held here.

Several users interviewed by *Computerworld* said their main reason for attending was to scour the show for sorely needed skilled staff.

"The staffing problem is a painful tumor on the networking industry," said John Morency, a principal at The Registry, Inc., a consultancy in Newton, Mass. "It's reached the crisis stage and is forcing users to take new and extreme measures, like searching trade shows for people that can help move enterprise networks forward."

TALENT SHORTAGE

Recruiters confirmed the LAN and WAN markets are hot, but they say the talent pool from which they draw is shrinking.

"There's roughly one-third fewer college students graduating with the backgrounds — computer science and electrical engineering — than there was a few years ago," said Jackie Larson, president of FocusTech, a recruiting firm in Chapel Hill, N.C. "That creates serious problems for user companies and vendors."

That is contributing to a rise in salaries (see chart). It's also what drove Earl Perkins to ComNet.

"My mission here is to attend tutorials and make connections with session speakers in an effort to find intelligent and motivated recruits that want to play a major role in moving our company forward on multiple networking fronts," explained Perkins, manager of network projects at Entergy Services, Inc., a public utility in Gretna, La. "The competition is ferocious, which means hiring has become a much larger part of my job."

Manugistics' Scott Miller: "We're looking for much more than circuit jockeys"

Perkins said he has openings for entry-level staff all the way up to senior project managers. He said pay isn't a problem for skilled staff, but he wouldn't divulge salary levels.

Staff shortages have forced many companies to hire contractors and expensive consultants. Some companies are even giving interns key networking responsibilities such as mapping out networks and tracking network addresses, equipment and lines.

AVERAGE COMPENSATION BY METROPOLITAN AREA*

	Director, networks	Manager voice/data networks
Dallas	$71,500	$58,917
Atlanta	$61,625	$65,000
New York/New Jersey	$82,260	$66,900
Miami	$86,667	$71,875
Chicago	$81,100	$51,500
San Jose, Calif.	$94,500	$83,333
Washington	$93,111	$66,231
San Francisco/Oakland, Calif.	$106,581	$77,962

*Salaries plus incentives

Base: [illegible] responses

Source: *Computerworld's* 1996 Annual Salary Survey

Other users are resorting to tactics such as recruiting attendees at vertical market user groups and luring network managers from large universities. The latter is popular because those people support a huge campus network and often have skills that span hardware, software and the Internet.

The convergence of the LAN and WAN also puts a crimp in efforts to fill networking vacancies. Firms are forced to hire staff who understand both areas, which users say is easier said than done.

"These aren't separate jobs anymore, but it's near impossible to find candidates with solid knowledge in both areas," James said. He said he is looking for LAN/WAN engineers and network administrators.

"We're looking for much more than circuit jockeys. We want people who know all seven layers of the [Open Systems Interconnection] model, not just [WAN] transport," said Scott Miller, a senior network engineer at Manugistics, Inc., a manufacturing software vendor in Rockville, Md.

"We need people who can configure routers *and* switches as they work together in an enterprise network," he explained.

Experience with LAN analyzers is another basic requirement. "You want people who can help build a network and monitor it," Miller said.

WWW

For links to related files, visit our Web site @Computerworld. Search www.computerworld.com/news/970210telcomlinks.html

Networking talent jumps to vendors

Some users claim that the toughest competitors for key hires are networking vendors.

"The person I reported to here left for a [networking] software vendor, at which time I seriously considered leaving to work for 3Com," said Kathy James, a network administrator at Yamaichi International America, a large 3Com Corp. shop and the New York-based subsidiary of Yamaichi Securities.

As a result, some users are turning the tables. Some of the senior-level managers at Entergy Services, for example, include steals from AT&T Corp. and Sprint Corp. And many view recruiters as the enemy because they focus on hiring people for vendors — especially start-ups — and not for user firms.

"Networking and communications are an extremely hot market because there's much more activity from companies that sell [networking] products, especially in the remote access area," said Joseph Kacevich Jr., president of Kacevich, Lewis & Brown, Inc. in Northboro, Mass. The firm recruits for vendors. "And if Internet companies can't find recruits with Internet experience, they then want candidates from networking and communications backgrounds." — Bob Wallace

---

SHORTS

NASD error deletes files

The National Association of Securities Dealers (NASD) last week accidentally deleted up to 20,000 electronically stored regulatory files. State regulators claim the deletions could make it hard to track disciplinary histories of stockbrokers and their firms. A spokesman for the dealers association said the data should be restored by May.

Apple to unveil PowerBooks

Apple hopes to regain some of its lost market share when it rolls out a new line of multimedia PowerBooks next week at Macworld Expo in Tokyo. The PowerBook 3400 line, code-named Hooper, is expected to be available this month and will run a 180- or 200-MHz version of the PowerPC 603E processor. The new PowerBooks are expected to cost $4,500 to $6,000, according to sources close to Apple.

Compaq cuts prices

Compaq Computer Corp. has slashed the price of its business desktop and notebook PCs, servers, workstations and networking products. The Houston company said it will reduce prices up to 17% on Deskpro PCs, up to 27% on some Armada 4100 and LTE 500 notebook PCs, and up to 20% on ProSignia 300 and ProLiant 5000 servers.

Encryption exports OK'd

The U.S. Commerce Department has issued its first export licenses for 56-bit encryption software under a new policy aimed at easing restrictions on the technology. The latest rules allow overseas sales of such software if companies submit plans for "key recovery" schemes. Trusted Information Systems, Inc. in Glenwood, Md., Digital Equipment Corp. in Maynard, Mass., and Cylink Corp. in Sunnyvale, Calif., all received export permission.

Oracle NCs to bow in Japan

Oracle Corp. plans to roll out its Pentium-based network computers in Japan on April 15. Oracle CEO Larry Ellison said Japanese vendors were the first companies that signed up to build the machines. The new computers will include 16-bit software and multilingual support.

Outlook wasn't brilliant, Microsoft warns

▸ *On vendor's advice, some Exchange users wait for upgrade*

By Barb Cole

EXCHANGE USERS who rushed to deploy Microsoft Corp.'s Outlook E-mail client can put on the brakes. Microsoft, which some critics claim is prone to shipping "beta" software, is advising Exchange users to wait for a revised version of Outlook slated for later this quarter.

There was no formal announcement. Rather, some product management employees at Microsoft have posted messages to an Exchange newsgroup advising users to delay their move Outlook. Several users also said their companies were directly told to wait.

Outlook, the integrated electronic-mail and groupware client that replaces the Exchange client, shipped with Microsoft Office 97 last month. The improved version will ship with Exchange 5.0.

Microsoft officials declined to specify how the versions would differ but said some bugs in Outlook had been discovered and fixed since Office 97 shipped.

Meanwhile, some users have reported on various Exchange user forums that messages disappear from their Outlook in-boxes and reappear when the client is closed and reopened. Others have reported that the Outlook client sometimes loses its place in the in-box and goes into a previously read message.

nstalling software
nce is enough

"We've almost come to expect this, but you still have to wonder why the hell they do it," said Kevin Henry, an information systems assistant at the University of Vermont School of Business Administration in Burlington. He was referring to Microsoft's penchant for shipping flawed products that prompt the vendor to release upgrades and service packs soon after. Henry said he has moved about 100 of the school's 2,000 Exchange users to Outlook, but will halt the rollout until Exchange 5.0 is available. "Installing software once is enough," he said.

Consolidated Edison Co. of New York, Inc. will delay a massive Outlook deployment until next month, according to systems specialist Bob Winterton. "We don't want to touch the desktops again, and we want the latest and greatest version of Outlook that will come out with [Exchange] 5.0," he said.

USERS' CHOICE

One Microsoft official said the recommendation to wait isn't meant to keep companies from rolling ahead with the new client. "There's no technical reason they can't deploy Outlook today," said Greg Lobdell, group product manager at Microsoft.

Lobdell insisted that installing the upgraded Outlook won't involve manual intervention at the desktop. "There will be some new [code] on the desktop, but the install will happen at the server level when [users] load Exchange 5.0," he said.

"Thankfully, we never jump on the bandwagon immediately," said Mike Levenson, an E-mail administrator at AT&T Wireless Services, Inc. in Bellevue, Wash., an Exchange site that hasn't moved to Outlook yet. "If we already had [Outlook] running, this would frustrate me. Why can't they sort this stuff out before they send out the software?"

But some early adopters of Exchange said the expected improvements aren't enough to hold up deployments.

"Chances are we won't wait" until Exchange 5.0 ships to deploy Outlook, said Erik Iversen, director of application development services at Nabisco, Inc., in Parsippany, N.J. Nabisco recently began to move its 8,000 Exchange users to Office 97 and Outlook.

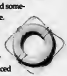
FDR SOS
TM
SAFEGUARD
OPEN STORAGE

It's More Than Dots & Dashes...

Today's information age began with the invention of the telegraph by Samuel Morse in 1837. And just as the familiar dots & dashes have come to symbolize Morse Code, Innovation Data Processing symbolizes cost-effective, fast, safe and reliable storage management solutions.

Joining forces with EMC Corporation and the Symmetrix® Enterprise Storage Platform (ESP), Innovation paves the way to a disaster recovery solution for open systems and LAN SCSI disk & database volumes to S/390 tape or disk directly across high speed mainframe channels without using network communications.

As you turn to open systems for business critical applications and as database systems continue to grow at incredible proportions, requiring hundreds of gigabytes and sometimes terabytes of disk storage, protecting this information is today's challenge.



With **FDRSOS**, your lifeline to Safeguarding Open Storage, large databases can be protected at ultra high speed and with reliable performance.

A typical user with a 100 GB database using a standard package currently requires 24-48 hours to backup to local DAT tapes. But with **FDRSOS**'s advanced technology, you can backup as much as 50 GBs per hour per tape control unit. And, in the case of disaster, recreate SCSI volumes concurrently without having UNIX machines or PC's operational or communicating.

High-Speed ··· Reliable ··· Cost-Effective ··· Storage Management Solutions

Backup Open Systems to Mainframe:
AIX® (RS/6000)™, HP-UX, UNIX®, SUN Solaris™, WindowsNT™, NetWare® and OS/2®

INNOVATION® DATA PROCESSING

CORPORATE HEADQUARTERS: 275 Paterson Avenue, Little Falls, New Jersey 07424 • (201) 890-7300
Fax: (201) 890-7147 • **E-mail: 76322.2076@compuserve.com • http://www.innovationdp.fdr.com**

EUROPEAN OFFICES:	FRANCE	GERMANY	NETHERLANDS	UNITED KINGDOM	NORDIC COUNTRIES
	01-47-69-15-15	089-489-0210	036-534-1660	0181-905-1266	+31-36-534-1660

Mainframe tool extended to Unix platforms

By Patrick Dryden

STERLING SOFTWARE, INC. this week will offer a new way for large organizations to extend some of the reliability and manageability of mainframe data centers to distributed client/server networks.

New versions of its host-based Solve: Operations tool kit run on two widely installed Unix-based network management platforms: OpenView from Hewlett-Packard Co. and NetView from Tivoli Systems, Inc.

Now information systems managers can consolidate their view of business processes that involve a mainframe and diverse servers throughout multiprotocol networks. That helps them maintain the level of service expected by users, according to officials at Sterling's operations management division in Reston, Va.

"This integration lets me define automated management policies once on the mainframe side, then distribute them to OpenView," said a beta tester at a global oil corporation who asked to remain anonymous.

That means operators don't require expertise and interaction with multiple consoles. Instead, they can track vital functions across many systems and devices — on both IP and SNA networks — from the OpenView console, he said.

More than just a "red-light monitor" to filter problem alerts, Solve: Operations helps operators react with an automated fix, said Mike Kahn, CEO of Clipper Group, Inc., an enterprise systems consultancy in Wellesley, Mass.

Tools that provide similar capabilities include Boole & Babbage, Inc.'a Command Post, Candle Corp.'s Command Center and Computer Associates International, Inc.'a Unicenter TNG.

Such tools can "reduce duplicate management efforts and lessen incremental expenses when the data center staff takes control of open systems," Kahn said.

Even more important is the power to view "business entities, not just infrastructure pieces," said Jay Borden, an analyst at Giga Information Group in Cambridge, Mass.

HOLISTIC VIEW

The reality

Operators must deal with separate tools to track availability of servers, applications and internetwork links

The future

Operators will track the availability of each user-relevant function by grouping several associated monitors

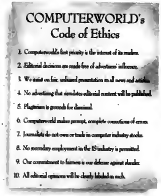
IS managers are hustling to meet the requirements of service-level agreements with business units. Users don't care about network or server uptime as much as they care about "the availability of their application from the client to the server and back," Borden said.

For example, Solve: Operations lets IS managers group multiple components of one financial function for easy monitoring. One view into a payroll process could include the database server, CICS transactions, the check printer and the network links in between.

Available now, Solve: Operations for OpenView or for NetView/AIX costs between $15,000 and $35,000.

"That's a small price to pay to lessen risk," Kahn said. The tools streamline management of critical functions, "so you need less labor to watch one place instead of five," he said.

You need to consider more than technology when choosing applications. Page 57.



COMPUTERWORLD's
Code of Ethics

1. Computerworld's first priority is the interest of its readers.
2. Editorial decisions are made free of advertisers' influence.
3. We insist on fair, unbiased presentation in all news and articles.
4. No advertising that simulates editorial content will be published.
5. Plagiarism is grounds for dismissal.
6. Computerworld makes prompt, complete corrections of errors.
7. Journalists do not own or trade in computer industry stocks.
8. No secondary employment in the IS industry is permitted.
9. Our commitment to fairness is our defense against slander.
10. All editorial opinions will be clearly labeled as such.

COMPUTERWORLD
Users ask mail vendors: "Can't we all get along?"
Visual Basic, Java vie for 'net crown

WORDS WE LIVE BY.

When you pick up a copy of *Computerworld*, you know you're getting the most objective, unbiased news and information in IS. Our code of ethics guarantees it.

Why do we make such a big deal out of editorial integrity?

Because the words you read in *Computerworld* often have a dramatic impact on your business, your career, and your future.

You use this information to evaluate new products. To get a candid view of emerging technologies. To find out the inside story on corporate strategies. To decide whether to jump ship or stay in your current job. To get the edge on your competition.

In short, *Computerworld* is filled with the words IS professionals like you live by.

WORDS YOU WORK BY.

Week in and week out, our editors and reporters call it the way they see it – on issues ranging from network management to reengineering. They dig deeply to bring you the most accurate, comprehensive news in IS.

It's no wonder over 147,000 IS professionals pay to subscribe to *Computerworld*. Shouldn't you? Order today and you'll receive 51 information-packed issues. Plus, you'll get our special bonus publication, *The Premier 100*, an annual profile of the leading companies using IS technology.

Call us toll-free at **1-800-343-6474**, or visit us on the World Wide Web at http://www.computerworld.com. To order by mail, use the postage-paid subscription card bound into this issue.

You'll get the kind of straightforward, impartial reporting you can work by. You have our word on it.

COMPUTERWORLD
The Newsweekly for Information Technology Leaders

Monkey on your back #15: How to make sure a server that's optimized for Windows NT® isn't less than optimal for your organization.

PENTIUM®PRO PROCESSOR

Pick a wrong server and things could get complicated. Pick a Digital server and suddenly life becomes less stressful. One reason: now you can get the Prioris™ server that came in first in the TPC®-C benchmark among all systems running Microsoft® Windows NT® 4.0 and SQL Server™ 6.5. And to make your decision even simpler, they all come with ServerWORKS™ Manager, the management tool that actually has Windows NT support built right in. Add the fact that no other vendor can equal Digital's full line of Windows NT-optimized products, or the service and support to back them up, and it becomes very clear: Digital is the optimal choice. For your nearest reseller, call 1-800-DIGITAL, or visit www.windows.digital.com.*

Prioris™ ZX 6000 Series

Winner of 6 AIM Technology Hot Iron Awards, 3 on Windows NT®

Full line of servers from 166 MHz to 200 MHz Pentium® Pro processors, designed with high bandwidth PCI.

64MB to 2GB memory.

ServerWORKS™ Manager and ServerWORKS™ Quick Launch are standard on all systems.

digital™

WHATEVER IT TAKES™

*First in price/performance with TPC-C results for Digital of 6,712.53 tpmC at $85.16/tpmC. Digital's TPC results (as of 11/14/96) obtained running Microsoft Windows NT 4.0 and Microsoft SQL Server 6.5 on a Digital Prioris ZX 6200 MP/4. TPC-C results for the performance runner-up Compaq ProLiant 5000 Model 6/200 c/s are 6,671.67 tpmC at $90.28/tpmC. © Digital Equipment Corporation, 1997. Digital, the Digital logo, ServerWORKS and Prioris are trademarks, and Whatever It Takes is a service mark of the Digital Equipment Corporation. Intel, Pentium, and the Intel Inside Pentium Pro processor logo are registered trademarks of the Intel Corporation. TPC is a registered trademark of the Transaction Processing Performance Council. SQL Server is a trademark and Microsoft and Windows NT are registered trademarks of the Microsoft Corporation in the U.S. and other countries.

HP puts stamp on Rmon 2 standard

► Tools that track application activity follow standard, but proprietary extensions persist

By Patrick Dryden

HEWLETT-PACKARD CO., the leading supplier of Remote Monitoring (Rmon) probes, will throw its weight behind the new Rmon 2 data-gathering standard at the same time it pushes proprietary enhancements — a situation that has tied users to individual vendors in the past.

In one sense, HP's move heralds a new age of openness for information systems managers who seek to mix and match tools instead of depending on single-vendor combinations to dig out vital performance data.

"We would like to watch all devices the same way, not need separate software for each kind of hardware," said John Ray, a telecommunications engineer at Lexis-Nexis in Miamisburg, Ohio. "Ideally, one performance analysis console should work with any vendor's probe."

HP'S SUPPORT FOR RMON 2

Products in Hewlett-Packard's NetMetrix line that support RMON 2

Product	Price
NetMetrix Enterprise Manager software	$20,995
HP J3458A Fast Ethernet LanProbe	$6,000
HP 4986 Ethernet LanProbe	$2,395
Firmware upgrade for FDDI, Token Ring and Quad Ethernet models	Free

HP, in Palo Alto, Calif., has implemented the Rmon 2 support required for such interoperability in two new LanProbe models and in firmware upgrades for three existing probes that provide the necessary power and memory (see chart).

But Rmon vendors such as HP are seeking differentiation by adding new monitoring capabilities, a process that continues the proprietary product cycle users have endured for the past two years.

For example, HP's Rmon 2 LanProbes can store protocol data and measure point-to-point conversations, two functions that aren't specified by the standard.

Unless other vendors look for this data from HP probes in their software, only HP's NetMetrix console can use it to help managers analyze the history and response time for application usage.

The original Rmon specification defined ways for standalone probe units and modules embedded in internetworking devices to gather basic data about network plumbing — the packets, errors and utilization on individual segments.

Widespread implementation of Rmon formed a foundation that vendors extended in their own ways to examine a higher level of activity — application usage from end to end. The Rmon 2 standard defines such application-level monitoring.

JOINING THE CLUB

Broad support for Rmon 2 is under way. Bay Networks, Inc. in Santa Clara, Calif., offers an Rmon 2-compliant management module that can upgrade some of its internetworking devices, and Concord Communications, Inc. in Marlboro, Mass., has released new firmware for its discontinued probes.

Rmon 2 support is also imminent from 3Com Corp. in Santa Clara, Calif., Frontier Software Development, Inc. in Chelmsford, Mass., and others.

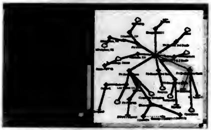
Concord recently shipped performance analysis software that reads data from Rmon 2 hardware, and integrator International Network Services, Inc. (INS) in Sunnyvale, Calif., has extended its monitoring service to cover multiple vendors' gear.

Performance analysis software from Concord and INS can gather Rmon 2 data from HP's new and upgraded probes and from other vendors' devices. But neither can yet use HP's extended capabilities.

Preventive networking

► Compuware monitor helps measure app performance, pass alerts

By Patrick Dryden



Compuware's EcoScope gives managers a user's-eye view of application performance

TO HELP information systems managers respond to network performance problems *before* the help desk phones ring, Compuware Corp. has enhanced its application tracking software to measure performance and warn operators of slowdowns.

The Farmington Hills, Mich., company this week will unveil Version 3.0 of EcoScope, formerly known as EcoNet.

The tool now recognizes packets for more than 1,500 off-the-shelf packages in addition to homegrown applications.

For the first time, those include applications based on the Internet Protocol, so IS managers can watch overall usage of their LANs and WANs as well as private intranet and external Internet resources.

"We can now measure precisely what response users get across our global WAN, down to examining the transactions for our Oracle database," said beta tester Michael Medwid, a senior communications analyst at software developer Symantec Corp. in Cupertino, Calif.

AT HOME WITH HBO

At Home Box Office (HBO) in New York, EcoScope profiles application usage for several groups: the network managers, application developers and administrators of systems and databases. Its reports help each group plan how to overhaul HBO's infrastructure to support bandwidth-hungry custom Oracle Corp. applications, according to beta tester Michael Smith, an HBO network manager.

Compuware cuts through "the patchwork of overlapping monitor functions" offered by management products to focus specifically on application performance, said Alison Palmer, an analyst at Hurwitz Group, Inc. in Newton, Mass.

EcoScope can "show who's wasting time on the [World Wide] Web as well as track the quality of service," Palmer said.

But she added that managers need to integrate performance monitoring with other functions, such as inventory and software distribution, for more complete management control.

Although EcoScope's monitoring is "a good first step, [it] still can't take corrective action, which is required to really manage an application," said Waverly Deutsch, an analyst at Forrester Research, Inc. in Cambridge, Mass.

> **EcoScope "can show who's wasting time on the Web as well as track the quality of service."**
>
> **– Alison Palmer, Hurwitz Group**

But Compuware has enabled its tool to pass alarms to any network management platform when it detects response time slowing for any monitored application. Then operators can apply specific tools to find and fix the problem.

"Watching the packets broadcast on the backbone is a good way to measure the round-trip time a user sees, but I worry about the impact of switching," said Tom Reinsel, a telecommunications analyst at Eli Lilly and Co. in Indianapolis.

Because switches can break traffic flow into many paths, "I would have to look through the monitor port on every switch to examine traffic paths across each backplane," Reinsel said.

Alternatives under development by vendors require monitoring agents at every client/server endpoint or measurement and control capability within the application.

EcoScope requires at least one Windows-based PC to act as a monitoring post that reports to a console. EcoScope is available starting at $36,000 for two consoles and 10 monitors.

& **You need to consider more than technology when choosing applications. Page 57**

Optimal tracking monitor on way

Optimal Networks Corp. expects this summer to offer a tool similar to Compuware's EcoScope that specifically tracks response time for IP applications and passes alarms to standard network management consoles.

The Palo Alto, Calif.-based vendor will unveil plans this week for Version 2.0 of Optimal Internet Monitor, which currently profiles application activity across intranet or Internet connections.

New functions will include monitors that warn of telnet access from possible security violations and track domain name server activity. Other functions include trend reports that depict utilization, throughput and response time for specified applications.

"I'd like this to compare the response times between dial-up and cable modem connections to promote a new service we're testing," said Internet Monitor user Xavier Darche, a technical applications analyst at Prime Cable of Las Vegas, a regional cable television operator.

Alarm support will let Internet Monitor 2.0 pass alerts to operators when a file transfer fails, for example, or when users access specific sites or experience unacceptable performance. Beta testing should begin in April.

— Patrick Dryden

TeamWARE
Flow

FUJITSU

www.teamware.us.com

Fujitsu is the world's second-largest computer company. Fujitsu and the Fujitsu logo are trademarks of Fujitsu Ltd. TeamWARE and TeamWARE Flow are trademarks of International Computers Limited in the UK and other countries. All other trademarks or registered trademarks are property of their respective companies.
©1997 Fujitsu Software Corporation. All rights reserved.

Acceptance slow for Windows CE devices

By Mindy Blodgett

TWO MONTHS AFTER the first wave of handheld devices based on Microsoft Corp.'s new Windows CE operating system entered the marketplace, the jury is still out on user acceptance.

But according to industry observers, some trouble may be brewing for the devices that Microsoft and the devices' manufacturers are pointedly calling handheld PCs (HPC). The vendors are trying to avoid a comparison with anemic-selling personal digital assistants (PDA).

[redacted]

The main differences between the Windows CE devices and PDAs already on the market are the ability to interface with Windows and true data sychronization between the devices and desktops or laptops.

PROBLEMS HARD TO SHAKE

But the problems that plagued the PDA market — users who carry a laptop plus a pager or cellular telephone and aren't convinced they need another device — may also dog the HPC.

"It's very early to tell, but it is my understanding that the CE devices are not doing terribly well at this point," said John Dunkle, an analyst at Workgroup Strategic Services, Inc. in Portsmouth, N.H. "It's the same old problem of whether people want a downscaled laptop or an overblown organizer."

Microsoft said it doesn't yet have numbers on sales. But one Windows CE vendor that asked not to be named said the $500 to $700 devices are selling steadily, but slowly. Corporate users especially are hanging back or cautiously testing the devices before committing to a rollout, observers said.

However, Carol Elfstrom, a spokeswoman for CompUSA, Inc. in Dallas, said that although no numbers were available, the devices were selling well, particularly the high-end models.

Stephen McCallister, MIS manager at Planned Parenthood of Western Washington in Seattle, is testing Casio Computer Corp.'s Cassiopeia. He said he was "basically happy with the platform" but has some concerns. "It is a totally new operating system," he said. "As it is, I support Windows users, Mac users — how many [operating systems] do I want to support?"

The devices have some kinks, including electronic mail that doesn't allow attachments and the lack of wireless remote data sychronization, said users and analysts who have tested them.

The Personal Computer and Communications Association (PCCA) recently formed a committee to address various issues with the handheld devices, including architecture, security and standards. The PCCA is working on several fronts, including setting standards for wireless access and encryption.

& The IRS decides to use wireless devices to track fraud. Page 47

FAA's IT management slammed

▸ *Agency criticized for IT failures that hinder systems modernization*

By Matt Hamblen

INFORMATION TECHNOLOGY management failures are seriously undermining the $20 billion effort to modernize the nation's air traffic control systems, charged a recently released report from the General Accounting Office.

"The FAA has a very complex system. It's real time, and lives are at stake," said Rona B. Stillman, the GAO's chief scientist for computers.

The GAO report blasts the Federal Aviation Administration for failing to develop a complete technical blueprint, or architecture, for systems to work together. And the report calls for a single entity at the FAA, such as a chief information officer, to force all FAA teams to use the same playbook.

Chastened FAA officials agreed they need a complete architecture and said they have an informal system in place to provide one. But the GAO countered that such informal management is "neither sufficient nor working well."

The GAO defined technical architecture as a plan for defining all the required information technology and telecommunications standards and critical systems characteristics for software, communications, data management, security and performance.

The lack of an agencywide architecture means the "FAA permits and perpetuates" inconsistency and incompatibilities, according to the report.

The result is that "future [air traffic control] system development and maintenance will continue to be more difficult and costly than it need be, and system performance will continue to be suboptimal," the report concluded.

FAA officials wouldn't comment beyond their remarks to the GAO. The FAA has 60 days to respond further before the report is reviewed by congressional committees.

David Schaefer, counsel to the U.S. House Aviation Subcommittee, said the GAO report sounds like something he has heard about the FAA for 13 years. "The FAA will say they've worked out their problems, but it turns out it's not enough," Schaefer said. "People on the Hill are sensitive to this. The public is concerned about waste and air safety."

Implementing a technical architecture should happen before the agency replaces its 30-year-old host computer system in 1999, Stillman said.

SIGNIFICANT CHALLENGE

The GAO report makes clear that creating a technical architecture poses a management challenge for an agency with decentralized power.

The "FAA has a culture like most large agency cultures that is averse to change and has entrenched autonomous organizations that tend not to respond to challenge," Stillman said.

Federal systems consultant Warren H. Suss said the FAA's regionalized management style means it has a "difficult environment" to manage.

"The FAA certainly could use stronger central direction to ride herd over the regions to ensure technological consistency," said Suss, president of Warren H. Suss Associates in Jenkintown, Pa.

GOA'S ADVICE TO FAA:

[redacted]

Source: U.S. General Accounting Office, Washington

Bad traffic patterns

FAA failings described in the GAO report include the following:

- **Seven of 10 air traffic control systems modernization development teams are working without a technical architecture. Of the three that are cooperating, two specify C and C++ as acceptable programming languages, and the other accepts Ada.**
- **One team's architecture specifies the Ethernet Protocol, and another specifies the incompatible Fiber Distributed Data Interface.**
- **Software applications associated with 54 air traffic control systems were written in 53 programming languages, requiring more training and support software for programming staff.**

HDS upgrades spice up 7700 disk arrays

By Tim Ouellette

HITACHI DATA SYSTEMS CORP. last week comforted its high-end storage customers by announcing a slew of software upgrades to its 7700 mainframe disk arrays.

The high-performance disk arrays, which have been the bread and butter of HDS' storage business, needed the features to keep up with products from mainframe storage market leaders EMC Corp. and IBM.

"Disk reliability is the most important feature of our strategy to deliver service to our users," said Howard Lewis, a senior vice president at NationsBank Corp.'s operational services division in Charlotte, N.C.

Leading the list of the 15 new 7700 features are the following:

- The capability to store Unix-based data.
- High-speed transfer of mainframe data to Unix server systems without time-consuming mainframe data calls.
- Support for mixed RAID-1 and RAID-5 security within the same subsystem.
- Online data migration that lets users transfer data from older systems without interrupting regular daily operations.
- New 7700s shipping with 3.5-in., 9.2G-byte disk drives.

Analysts endorsed the Santa Clara, Calif., company's strategy of offering upgrades without requiring users to buy new systems. Some features will be automatically added to new and existing systems; others are optional.

"Vendors need features like online data migration to even make a customer's bid list," said John McArthur, an analyst at International Data Corp. in Framingham, Mass.

"Storage managers are managing more data with the same resources, and they are looking for anything that can off-load some of the work," he added.

For example, Lewis said the online migration feature saved NationsBank four months of weekend work and 40 hours of planned outage time.

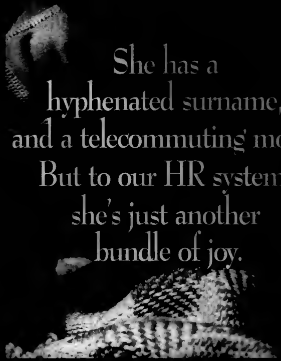
Some features are available now; others will be delivered by midyear.

H R MANAGEMENT SYSTEMS

HRi

Technology

Product
Features


She has a
hyphenated surname,
and a telecommuting mom.
But to our HR system,
she's just another
bundle of joy.

1 800 CALL ADP
xt 400

ADP
Focus on what matters

Early users tout NC cost savings

CONTINUED FROM PAGE 1

"We salvaged 400 286-, 386- and 486-[based] systems by turning them into [network computers]. When we started this project, we thought we would have to throw [them] away."

Uarco is a $550 million business-document printing company with 10 printing plants and four customer service centers nationwide.

The company spent about $2 million on infrastructure upgrades and equipment to create its network computing environment. That cost included the purchase of 400 Winterminals from Wyse Technology, Inc. in San Jose, Calif., to supplement the 400 salvaged PCs.

The PCs run the WinFrame network operating system from Citrix Systems, Inc. in Fort Lauderdale, Fla.

"We are realizing a savings of between 70% and 90% of the cost of maintaining a shop of strictly PCs," Gouverneur said. "We estimate it costs us about $2,000 a year per user for [network computer] maintenance."

Uarco's network computing effort was part of a larger companywide migration to client/server systems from a mix of mainframe and isolated LANs. All but about 50 power users at the main office use the network computers.

Analysts' research seems to support Uarco's hopes for cost savings. Zona Research, Inc. in Redwood City, Calif., estimates that a network operating system, such as WinFrame, that runs on the Network Computer from Boundless Technology, Inc. in Austin, Texas — a system similar to the Winterminal — over five years will cost 57% less than PCs that run Windows. Zona estimates that the Network Computer costs about $1,200 per user per year, compared with $3,000 per PC user for the same period.

Gartner Group, Inc. in Stamford, Conn., also concluded, cautiously, that network computers can save users money. In a report, "Network Computer: Panacea and Pandora's Box," Gartner estimated that some network computers could provide a 41% savings compared with PCs.

Network computers, which are usually diskless, don't require as much individual care as PCs because software and driver updates are done from a central location.

— Kent Polzin, Simmons

Sears, Roebuck and Co. in Hoffman Estates, Ill., plans to implement more than 2,000 thin-client devices from Boundless Technologies later this year. The retail giant will deploy the machines nationwide as point-of-sale machines in its automotive centers.

Sears officials said the fact that the company already uses diskless PCs in many locations will ease the transition to network computers. The retailer cited ease of administration and centralized software distribution as two major advantages of network computers over PCs.

Don Laidlaw, a senior technical specialist at NxTrend Technology-Canada, Inc., a systems integrator in Thornhill, Ontario, said his company is also implementing network computers for internal use and reselling IBM's Network Station to customers.

NxTrend plans to put Network Stations on all its database programmers' desks because the programmers need only limited access to typical PC applications and focus on just a few job-related applications most of the time. NxTrend is piloting 10 of the machines but could branch out to several hundred if they are successful.

ADVANTAGES

Benefits of the network computing environment are superior and centralized management and better security, Laidlaw said. "The fact that we can upgrade software on the server is attractive," he said.

Kent Polzin, manager of technical operations at Simmons Co. in Atlanta, also points to centralized management features such as software distribution, which typically requires time and money.

He noted that network computers, which usually are diskless, don't require as much individual care as PCs because software and driver updates are done from a central location, and users can't fiddle with them.

Laidlaw tells his customers to look closely at the users and their functions. "If users need constant access to Windows-based applications, they are not the best candidates for a [network computer] since they don't access them directly," be said.

COMPUTERWORLD
• For links to related files, visit @Computerworld: www.computerworld.com/news/970210nclinks.html

"We are realizing a savings of between 70% and 90% of the cost of maintaining a shop of strictly PCs"

Snapshot

COMPUTERWORLD LANDS AT SOUTH POLE. International Data Group (IDG) has launched Computerworld South Pole on Antarctica, the only continent where a Computerworld wasn't already published. IDG Chairman Patrick McGovern displays the first issue at the pole marking the geographic bottom of the world. The Antarctic computer market is relatively small at only about $50 million, but McGovern noted that it is growing by 30% per year. The annual population of Antarctica peaks at about 4,100.

Oracle tools to get Java, C++ technology

By Sharon Gaudin

APPLICATION DEVELOPMENT

ORACLE CORP. has licensed Java and C++ technology from Borland International, Inc. to bolster its application development tools line and ultimately its upcoming network computers.

Oracle licensed the source code, object code and other general technology for Borland's JBuilder and its new C++Builder.

Oracle will embed the Java technology in its Designer 2000 and Developer 2000 environments. Those environments will also feature Sedona, Oracle's object-oriented developer for building network computer applications.

The Java-enabled edition of Developer 2000 will ship next month.

A BIGGER PICTURE

"Oracle is recognizing that you're not just dealing with single-point tools anymore," said Evan Quinn, an analyst at International Data Corp. in Framingham, Mass.

"Oracle has Developer 2000, which is a fine component consumer, but you can't build components with it. You certainly can with Borland's tools. Now Oracle has a more holistic story," Quinn said.

Oracle is specifically interested in Borland's Java technology, according to Dennis Moore, vice president of tools product marketing at Oracle.

"Java is the language of network computing. We'll need Java to develop applications for our network computers," Moore said.

Moore said Oracle will make additional Java announcements next month.

He said a new Java-based user interface will be part of the upcoming Developer 2000 release. The interface will be separable so it can be used with other environments.

Quinn said that is a good deal for Borland, which has seen its revenue and mind share take a dip in recent quarters.

"Look how rich Oracle is as a channel for someone like Borland," Quinn said. "At this point next year, I think their financial situation could look a lot brighter than it looks right now."

Oracle's new applications package targets resources planning. Page 43

Server-based apps may cut desktop costs

CONTINUED FROM PAGE 1

Corp. and Sun Microsystems, Inc. use to push their Network Computer, a diskless PC.

But users and analysts said such devices aren't the only factors pushing Microsoft toward server-based applications. There is also the booming growth of the server-centric Internet and the need for enterprise-scale applications.

The ability to build ActiveX components will appeal to IS managers who create 'net applications

Developers long could build server-side applications with Microsoft's Visual C++, but bringing Visual Basic into that realm will add an estimated 2 million to 3 million users.

Visual Basic 5.0 can build active documents, which means an application can sit on the server and be called up on the client or through a browser. The tool also will move client applications to the Internet. Visual Basic 5.0 also has ActiveX Control Creation, which makes it much easier for developers to build ActiveX components.

Dan Mezick, a Visual Basic trainer at New Technology Solutions in North Haven, Conn., said the ability to build ActiveX components will appeal to the growing number of IS managers who need to create Internet applications.

"Microsoft released that part months earlier. Why would they do that unless people were screaming for it?" he asked.

Many users and analysts predict the upcoming version of Microsoft's Visual C++ will have the same active server-based capabilities as Visual Basic 5.0. And there are rumors Visual J++ will be similarly equipped. The three languages will be packaged in Microsoft's upcoming Visual Studio 97.

PUSH IS ON

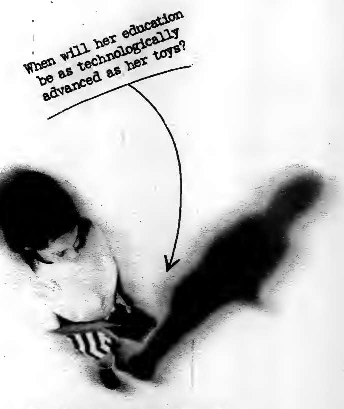
"They're getting the tools aligned to support an Internet push," said Evan Quinn, an analyst at International Data Corp. (IDC), a research firm in Framingham, Mass. "They're hedging their bets against network computers spilling over and competing directly against PCs. They also recognize that in the corporate world, a lot of client/server applications are going to get shifted to an intranet or the Internet, and they've got to work on the server to play in that market."

"This is right on the central path of what we're doing," said Dave Lingren, director of advanced development at Dunsgate, a New York-based company of The Dun & Bradstreet Corp. "We need to build a very elaborate [World Wide] Web site with a lot of logic, database access and business rules. All of that needs to sit on the server. This will absolutely revolutionize how long it takes us."

Bharath Narayan, a senior consultant at Cap Gemini America, a software-based applications development consulting firm in Cincinnati, said he is moving toward server-based applications, but Microsoft's release will further propel him.

"If Microsoft did not have the capability, then I would be looking at other tools that are capable of doing it," Narayan said. Currently, 20% of the applications he builds are server-based, he said. But Narayan said he expects that in two years, that number will jump to 80% or more.

However, Chris Kwiecinski, a senior systems developer at Nabisco, Inc. in Parsippany, N.J., said, "There's a lot more issues to think about with server-side applications. Who has access to the data on the server? How do you provide access? How do you protect your information? It's a lot to think about."


When will her education be as technologically advanced as her toys?

Technology. It's moving fast. And our schools are falling behind. Why? Lack of funds. Lack of resources. Lack of expertise. That's where your company comes in. By supporting Tech Corps. A grassroots effort to enhance teaching and learning through technology. And give students the advantage they need to get ahead in the game of life. Discover the rewards of becoming a Tech Corps Corporate Sponsor.

TECH CORPS

508/620-7751 • http://www.ustc.org

America needs to know.

Organizations already providing national sponsorship include Cellular Telecommunications Industry Association Foundation (CTIA), Digital Equipment Corporation and MCI Foundation

SHIP
TO

PING

DAY

After 18 months of anticipation and thousands of man-years in development, we are proud to announce the General Availability of new Unicenter TNG.™

For integrated network and systems management, "TNG" is The Next Generation.

With a revolutionary 3-D interface that incorporates virtual reality, innovative Business Process Views™ and the power to provide total Enterprise Management, Unicenter TNG is years ahead of the competition. It reaches across every major hardware and operating system to give you a single, integrated solution that can manage all your systems, networks, databases and applications. And it's supported by the world's leading independent software company with over 20 years of experience.

If you're tired of promises, frustrated with "frameworks" and fed up with trying to patch together your own piecemeal approach, today is your lucky day. A real solution to all your Enterprise Management challenges is just a phone call away.

Call 1-888-864-2368, or visit www.cai.com

New Unicenter TNG. It's the proven, mission-critical solution that's available just when you need it most.

Today.

Unicenter
TNG

20th anniversary
COMPUTER® ASSOCIATES
Software superior by design.

Unicenter TNG™

©1997 Computer Associates International, Inc., Islandia, NY 11788-7000. All other product names referenced herein are trademarks of their respective companies.

New owner makes right moves with D&B Software

▸ *Geac vows to continue R&D spending*

By Randy Weston

USERS OF Dun & Bradstreet Software products are sailing calmer waters these days under new owner Geac Computer Corp.

But users said they are still watching the company carefully to make sure it stays on course.

"I have received reassurance that it would be business as usual and that there wouldn't be any reduction in [research and development] spending," said Dick Hudson, chief information officer at Global Marine Corp. in Houston. "By the end of this year, we should know if Geac plans to meet that commitment or not," he added.

Geac seems to be keeping its promises

Global Marine is a $600 million-per-year international offshore oil drilling company. So far, Hudson said, Geac seems to be keeping its promises. "For us, [the ownership transfer] has been a nonevent. It's like nothing happened. We are putting in the latest release of the SmartStream products, and we have not had any support problems at all."

BUYER WANTED

D&B Software users were left in limbo for more than a year as The Dun & Bradstreet Corp. sought a buyer for its business application division.

Dun & Bradstreet last July announced that Boston venture capitalist firm Bain Capital intended to buy the software division, but negotiations broke down before the deal could be finalized.

In October, Geac, a computer industry investment firm in Markham, Ontario, stepped in with an offer of $150 million. But users and analysts were worried that Geac couldn't handle a company as large as $350 million D&B Software. The purchase more than doubled Geac's total holdings.

Analysts and users have applauded Geac's decision to split D&B Software into two divisions: a mainframe software unit called HostStream and SmartStream, the client/server software business.

"The moves so far have been forward-thinking and in the right direction," said Barry Wilderman, an analyst at Meta Group, Inc. in Stamford, Conn. "Users are also much better off with Geac than with Bain."

Unlike Bain, Geac is in the computer industry and has a history of sticking with companies it purchases, Wilderman said. Because Bain is purely an investment firm, there was concern it would simply try to get its investment back, a less stable prospect for D&B Software customers.

Besides the move to divide the company into two divisions, Wilderman and Hudson pointed to a decision to port SmartStream to more than one platform. The product currently works only with Sybase, Inc. databases.

"Making SmartStream products work on multidatabase platforms instead of just Sybase is an intelligent decision," Hudson said. "Why cut yourself out of two-thirds of the market?"

A much-anticipated version of SmartStream for Microsoft Corp.'s SQL Server Version 6.5 is now in beta testing and due for delivery next month.

▪ Air France moves reservation pieces to Unix server

Object project flies

By Craig Stedman

AIR FRANCE IS preparing for takeoff on a project that will shuttle key pieces of its mainframe-based reservation system to a Unix server running an object database — a maneuver that it hopes will lead directly to a 1% revenue boost.

The Paris-based airline has annual sales of more than $7 billion at current exchange rates, so an additional 1% would translate into $70 million in new business. "That's quite a large amount of money for us," said Pierre Gandois, who is managing the project at Air France.

NOT SO FAST

Air France is one of the first companies outside the telecommunications and financial industries to use an object database in a core transaction application, said Liz Barnett, an analyst at Giga Information Group in Cambridge, Mass.

But that doesn't mean object databases will soon be widely infiltrating data centers, she said. "It's definitely still a niche kind of thing," she said.

Even Air France is going only so far with the technology. Airlines as a whole still depend on mainframes to run their transaction-gobbling reservation systems, and Air France plans to leave all ticket processing on its Unisys Corp. mainframe, Gandois said.

The Unix system, which began final testing last week, will take over the airline's revenue and yield management applications.

By leaning on the object database, Air France hopes to get a real-time system that can help better fill planes with higher-paying customers, Gandois said.

The airline's revenue managers can now track only individual segments, which means that filling up a Paris-to-New York flight could prevent it from selling more expensive tickets to passengers who want to start elsewhere and connect to that flight. The new system will track "a combination of flights rather than looking at each flight as a single unit," Gandois said.

TICKET HANDLING

Parameters for ticket availability and discounts will be set by an Oracle Corp. relational database running on a Sun Microsystems, Inc. server that gets nightly batch feeds from the mainframe. As flights start filling up, ticket requests will be fed through another Sun server with Versant Object Technology Corp.'s object database, which will approve or deny bookings. Approved requests will then be processed at the mainframe.

About 20% of the airline's 500 daily flights are expected to be controlled by the Versant-based system, which is due to go live in March or April, Gandois said. Air France declined to disclose its investment in the project.

The C++ application was written by Sabre Decision Technologies, the software development arm of AMR Corp. in Fort Worth, Texas. Sabre is marketing the design to other airlines, but many "are scared to go into an object database" because the technology is unproven for transaction processing, said Vic Nilson, Sabre's Air France project director.

FRENCH FLY

Some details on Air France's object database project

- **The object database runs entirely in memory, eliminating the need to read data from disks**
- **Ticket requests will take longer to process, but Air France hopes to keep the added time to less than 40 milliseconds**
- **The airline's 100 revenue managers will use PCs running Windows 95**
- **The database can automatically open or close discount offers as business conditions change**

HP pumps up its Unix cluster suite

By Jaikumar Vijayan

HEWLETT-PACKARD CO. is enhancing the application availability and systems management capabilities of its suite of Unix clustering products.

The enhancements aim to give users simplified application management within a cluster and more protection against server failure for applications running on the Internet. The management enhancements will be available by the end of the second quarter in a new version of HP ClusterView software.

They include drag-and-drop capabilities for moving applications between different systems or between servers in separate buildings. This allows administrators to move applications off one server to another for performing tasks such as upgrading operating systems.

APPLICATION MANAGEMENT

HP will also integrate performance monitoring tools such as HP GlancePlus and PerfView with ClusterView. The tools will give users system-performance monitoring information directly from ClusterView.

"Capabilities like these are very important for us," said Barry Flachsbart, vice president of information systems at Skyway Freight Systems, Inc. in Watsonville, Calif.

"We run a pretty continuous operation here, and it is important for us to be able to manage things remotely and to do things like adding or changing processors [in a cluster] without bringing the whole system down," he said.

HP also announced availability of a new Network Connection Policy Manager that lets administrators balance and manage client access to the network. For example, Internet requests from hundreds of browser connections can be balanced automatically across the nodes of a cluster.

On the high-availability side, HP said it will release new versions of its MC/ServiceGuard and MC/LockManager clustering software that includes support for 'net-based applications.

The software, due in the second quarter, will include support for a feature called "campus cluster" that allows systems as far as two kilometers apart to be clustered together.

Network Connection Policy Manager starts at $1,000. The enhanced version of HP ClusterView will start at $1,500, and MC/ServiceGuard with campus cluster support will start at $6,000.

Instant intranet. Just add Netra™.

First it was the Internet, now it's the intranet. And everyone wants it built yesterday. You could try to throw together a bunch of hardware and software into a stopgap solution, or you could just unpack a Netra–the servers built specifically for the intranet. Netra's award-winning, easy-to-use interface makes it an ideal foundation on which to run all your critical business applications quickly and effectively. Plus, you get comprehensive security, including firewall, virus and intrusion protection. And with Netscape™ Enterprise Server Software built in, it's little wonder Netra is the choice of intranet professionals everywhere. Perhaps that's why PC Computing, New Media Magazine and LAN Magazine have piled on the awards. But then what else would you expect? After all, Sun's the intranet expert. To learn more about what Netra servers can do for you, contact us at at http://www.sun.com **THE NETWORK IS THE COMPUTER™**

Sun microsystems

©1997 SUN MICROSYSTEMS, INC. ALL RIGHTS RESERVED. SUN, SUN MICROSYSTEMS, THE SUN LOGO, NETRA, JAVA AND THE NETWORK IS THE COMPUTER ARE TRADEMARKS OR REGISTERED TRADEMARKS OF SUN MICROSYSTEMS, INC. IN THE UNITED STATES AND OTHER COUNTRIES. NETSCAPE AND THE NETSCAPE LOGO ARE TRADEMARKS OR REGISTERED TRADEMARKS OF NETSCAPE COMMUNICATIONS CORPORATION. ALL TRADEMARKS ARE PROPERTY OF THEIR RESPECTIVE OWNERS.

At DIGITAL, we don't just make high-performance computers. We make high-performance customers.

Perhaps you've admired them from afar: The telecommunications firm that set a goal of 99% system uptime–and surpassed it. The auto manufacturer that radically accelerated its time-to-market with a powerful new data system. The financial services processor that gives institutions in 20 countries highly secure transactions–instantaneously. Granted, at DIGITAL we're known for our fastest-on-earth, ultra-reliable AlphaServer™ systems. But what we really produce are groundbreaking competitive advantages–in company after *Fortune* 500® company. Advantages like the leap in customer responsiveness that comes with the industry's only tried-and-true 64-bit servers–whether they're running DIGITAL UNIX,® OpenVMS™ or Windows NT.™ Or the bankable investment value of high-availability "clustered" systems created to work every second of every day. Or the vast array of options made possible by our partnerships with other industry leaders. Naturally, we support these business solutions with our own global network of service professionals. So call **1-800-DIGITAL**. Make the leap to **www.ads.digital.com/chasm**. And make the DIGITAL edge your own.

digital™

Whatever it takes.℠

A11P

©1997 Digital Equipment Corporation. DIGITAL, the DIGITAL logo, AlphaServer and OpenVMS are trademarks and Whatever it takes is a service mark of Digital Equipment Corp. UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company, Ltd. Windows NT is a trademark of Microsoft Corporation. All other names are trademarks or registered trademarks of their respective companies.

Who's in the online pool?

▸ *Law requires racial data from online job seekers*

By Julia King

DO YOU KNOW HOW many whites, blacks, Hispanics, males and females are replying to your online job postings?

If not, you may be violating federal employment laws, which require companies to prove that pools of job applicants match area demographics.

WHITE MALE OVERLOAD

By law, all companies that do business with the government — that would include most large corporations — are required to furnish regulators with data about the race and gender of job applicants. But online job banks don't provide this information.

Consequently, employers that recruit on the Internet — whose users are predominantly white males — may face greater exposure to discrimination complaints.

"Companies aren't prohibited from using technology for recruitment, but if they're pulling down resumes [from the Internet], they could generate a pool of candidates without knowing race and gender [data]. And that presents a problem," said Joe Kennedy, deputy director of the Office of Federal Contract Compliance Programs in Washington.

The Internet "has allowed companies to broaden their search, which should be good from an affirmative action standpoint," Kennedy said.

"But at the same time, there are concerns that use of computers has not penetrated all of society," he said.

Eli Lilly's Ron Anglea says he prefers to use the Internet as an advertising tool rather than a recruiting tool

These concerns were enough for Eli Lilly and Company to strictly limit its use of the Internet for recruiting.

LEAD THEM TO LILLY

"The [contract compliance] office here in the Midwest is not real favorable on companies using the Internet to pull applicants [because] they feel it could be discriminatory," said Ron Anglea, national recruiting and staffing manager at Eli Lilly.

"So we've taken a conservative approach," he said.

For one thing, Eli Lilly doesn't download resumes from job banks. Instead, it advertises available jobs on its own corporate Web page "and invites people to come to us," Anglea said.

Rather than use it as a recruiting tool, "we've taken the position that the Internet is an excellent advertising tool," he said.

For these related sites and more links, see our Web site at www.computerworld.com

THE ASSOCIATION FOR WOMEN IN COMPUTING

• [illegible]

Dedicated to the advancement of women in the computing industry. Offers programs, links and information.

***COMPUTERWORLD'S* CENTER FOR PROFESSIONAL DEVELOPMENT FOR IT CAREERS**

• [illegible]

Offers reviews, employer profiles, sources for relevant jobs, hot topics, features, conferences and other information

BLACK DATA PROCESSING ASSOCIATES

• [illegible]

Concerned with the impact of technology on minorities

MINORITY CAREER RESOURCES OCC

• [illegible]

Lists resources and Web sites for women and minorities

Internet recruiting hasn't lived up to hype

CONTINUED FROM PAGE 1

Too many job sites and an ever-growing glut of junk resumes — often replicated from site to site — are common complaints.

Another big problem is the lack of sophisticated search and resume-tracking tools to help recruiters wade through the information.

LITTLE EFFECT

Meanwhile, that electronic tidal wave is washing over human resources organizations, many of which are still processing resumes manually.

And while the numbers are hard to come by, there is no overwhelming evidence that companies are hiring more or better-qualified candidates on the Internet than they would if they were using traditional recruitment methods.

"I'd love to find people directly from the 'net, but my experience is that doesn't happen frequently," said Robert Cortlandt, executive information systems recruiter at The Gap, Inc. in San Francisco.

Cortlandt said in the past six months he has hired only two of 62 new employees by searching various online resume banks.

"It's really rare to get hired from the 'net," said John Sumser, an analyst and CEO at Internet Business Network.

"Job hunting is one of the places on the 'net where spam is a way of life," he explained.

That is partly because posting a resume online is usually free. And sending a resume in response to an online advertisement involves little more than pointing and clicking on a job listing.

Moreover, the quality of online resumes at several services has gotten so bad that some recruiters are dropping them altogether. Among them is David Kosek, president of Career Vision, Inc. in Centreville, Va.

"You waste a lot of time [because] most resumes don't say what salary range the candidate is looking for or if they'll relocate," Kosek said. "It's not that much better than cold calling."

> "Job hunting is one of the places on the 'net where spam is a way of life."
>
> – John Sumser
> Internet Business Network

DAILY SURFING

Other IS recruiters, including Lora Hyler at Wisconsin Electric Co. in Milwaukee, have reported that they can't keep up with the ever-growing number of sites to surf.

"You really need to stay current because new resumes are being posted daily," Hyler said. "The key is having the time and staff to surf on a daily or twice-a-week basis, and very few people have that."

Weeding for hours through hundreds of electronic resumes isn't Ron Anglea's idea of efficient or cost-effective employee recruitment. "I see these sites packed full of jobs, and I'm not so sure people are willing to scroll through them all to get to the jobs I've listed," said Anglea, national recruiting and staffing manager at Eli Lilly and Company in Indianapolis.

Then there is the increased danger of violating federal job recruitment statutes, given the preponderance of Internet users who are white males (see story above).

For all these reasons, Anglea said he holds no grand illusions about filling immediate job openings via cyberspace.

But like most recruiters, he doesn't intend to drop off the Internet, either.

Instead, he has modified his approach; Anglea has dropped Internet job services in favor of advertising jobs on Lilly's corporate home page, where he has more control over the content and can monitor usage.

Others are willing to stick it out while they wait for new tools and services to emerge that will help companies sort through the information glut.

Those tools and services include proprietary searching software geared to work with an individual job bank and automated resume-tracking systems that users implement in-house to work with many online services.

SHAKEOUT

But in a year or two, there is a good chance companies won't need to buy those tools and services.

That's because the top job banks will start to offer more sophisticated capabilities online.

Wes Richards, a partner in the IS practice at Heidrick & Struggles, an executive search firm in Menlo Park, Calif., predicts that top online job banks will begin to offer services such as confirming degrees, checking job histories and performing criminal checks.

A shakeout in the next two years among today's bumper crop of online job sites also will help curb the current information glut, according to Bill Bass, an analyst at Forrester Research, Inc. in Cambridge, Mass.

Forrester has predicted that the online recruitment market eventually will coalesce around two or three players that have huge databases, plus 10 or 20 specialized services aimed at specific industries.

"But we're talking about a gradual shift," Bass said.

"Right now, this is a market that people are still trying to figure out," he said.

It was supposed to be the launch of a development *project*...

Not the project *manager*.

Should've used UNIFACE

COMPUWARE

www.compuware.com
1-800-365-3608
uniface.info@compuware.com

What

most powerful

about our

computers are

their human

parts

technology
leadership
collaboration
quality

If you took one of our computers apart, piece by piece, there would be thousands of parts you'd never see. They're the people behind the box. The engineers committed to designing computers that not only meet your needs, but exceed them. The people dedicated to service and support, and every one of our industry partners. All the people whose sole focus is to bring you relevant technology, that enhances your life. By building relationships. Providing solutions. And designing products with you in mind. It's our relationships that are the power behind our computers. We work closely with Intel, Microsoft and others to be the first to provide you with innovative computing that's easy to use. That moves you into the future. With technology that works for you. For your life. It's our intention to become your complete computer solutions provider. Bringing you the right tools for your home and office, for your entertainment and productivity. Through open dialogue and well thought-out design, we prove we build it better. And we demonstrate that, by leading the world in portables. In fact, around the globe, Toshiba stands for innovation and quality. And that's not about to change. To find out more about us, call 1-800-457-7777, or look us up on the Web at http://computers.toshiba.com.

In Touch with Tomorrow
TOSHIBA

Banyan slide continues with another quarterly loss

By Laura DiDio

BANYAN SYSTEMS, INC. continues to bleed red ink.

The Westboro, Mass.-based company announced last week that its fourth-quarter loss totaled $28.6 million, compared with a loss of $17.3 million during the same period a year ago.

Banyan's revenue plunged nearly 40% for the quarter, to $17.2 million. The latest results include charges of $5.5 million and an $8 million deferred tax write-off.

Company officials pointed out that losses would have been $12.6 million if the one-time charges were excluded.

CONTRACTING BASE

Analysts said they weren't surprised by Banyan's poor showing and predicted it will be difficult for the company to return to profitability with its current lineup of products.

Matt Cain, an analyst at Meta Group, Inc. in Stamford, Conn., said, "Clearly, the Vines installed base is contracting. The best that Banyan can hope for is that Vines customers don't toss Banyan altogether but instead opt to deploy StreetTalk for Windows NT as part of their network operating system migration plans."

Cain said Banyan's murky financial picture hasn't affected the technology.

"Vines and StreetTalk work just fine, and even if Banyan were to shut its doors, users would still be supported. And Banyan does have a viable revenue stream from service, support and maintenance," he said.

But one longtime Vines user, who requested anonymity, expressed dismay over Banyan's ongoing decline. "The doom-and-gloom prognosis for Banyan would be amusing if I didn't have so much invested. I just have to hope Microsoft ships Windows NT 5.0 later this year. Clearly, Vines and StreetTalk are not our strategic platform," he said.

REBUILDING APPLE

Amelio: Yes, we have a crisis

▸ *Apple shuffles executives, gives founders roles*

By Lisa Picarille
CUPERTINO, CALIF.

COMMON WISDOM dictates that the first step to recovery is admitting the problem. At last week's annual shareholders meeting, Apple Computer, Inc.'s chairman and CEO Gilbert Amelio acknowledged Apple is a company in crisis.

Amelio outlined five crisis areas, including liquidity, quality, operating system strategy, corporate culture and fragmentation of focus. And he laid out Apple's plans to overcome those problems.

In a bold move, Amelio suspended the company's generous executive cash bonuses until Apple turns a profit. The move came less than a month after the company reported a $120 million loss. Observers said suspension of bonuses could save millions of dollars. Amelio earned more than $2.3 million in bonuses last year, according to Apple.

Apple officials have also acknowledged the need to cut operating expenses by $400 million — or 25% — and that will mean a hefty workforce reduction. Details will be forthcoming in March, Apple said.

The day before the meeting, Apple announced an executive reshuffling intended to streamline operations and renew enthusiasm in the company.

Under the plan, Steve Wozniak will join Apple's other cofounder, Steve Jobs, as a member of the executive committee and play an advisory role to Amelio. The following changes were also announced:

- Guerrino De Luca, president of Apple subsidiary Claris Corp., was named to head a unified marketing group that will also be responsible for developer relations and operating system licensing efforts.
- Apple plans to split research and development into two parts. Hardware will be overseen by John Rubenstein, formerly of Fire Power Systems, Inc. Avie Tevanian from Next Software, Inc. will head software efforts.
- Ellen Hancock, formerly chief technology officer, will oversee a technology office that includes the advanced technology group, quality assurance, the chief scientist and all Apple fellows.
- Marco Landi, formerly chief operations officer, will head up worldwide sales.
- George Scalise will cover a mixed bag, including legal, manufacturing and Apple's imaging group.

"We barely had enough cash to conduct day-to-day business – to meet payroll, to fund receivables, to pay bills."
– CEO Gilbert Amelio, describing the situation when he joined Apple.

"Today their chances of survival are higher than yesterday," said Charles Wolf, an analyst at Credit Suisse First Boston Corp., a New York investment banking firm. "It now looks like they have the right people in the right positions, and since getting their house in order should be their most urgent objective, I take this as a good sign."

Another good sign, according to industry watchers, is that Apple is finally admitting the obvious.

"Today, with the stock at such a low point, I think I would be in denial if I stood up here and didn't own up to the fact that we have been dealing with a crisis and we are still very much in a crisis and I am going to deal with it like a crisis situation," Amelio said.

What should Apple do? Everyone has an opinion

By Lisa Picarille

ONE YEAR AFTER taking charge at Apple, Gilbert Amelio's three-year operation to revive the ailing company has run into complications.

So *Computerworld* asked users and analysts to write a prescription for Apple's return to good health. Here is a sampling of their ideas:

"Apple has to concentrate on beefing up the portables line; improving and managing the [operating system] road map, especially with its dual [operating system] strategy; provide better marketing for Power Macs and Performas to help boost market share; and make sure it keeps developers interested in the platform."
— Kevin Hause, an analyst at International Data Corp. in Mountain View, Calif.

"Lou Gerstner has done an unbelievable job at IBM. He is always talking to his counterparts in large organizations. I don't think that is a bad model to follow."
— Stuart Greenfield, a systems analyst for the state of Texas in Austin

"Apple should concentrate on Web development, the integration of Web design and database information. Because the Mac is the easiest platform for Web content creation, it is my first choice."
— Neil Nevarez, manager of publications and new media at The Wharton School at the University of Pennsylvania in Philadelphia

"They should make a plan and stick with it. They should stop changing directions. Just say they're going to do something and actually follow through."
— John Pope, partner at The Carson Group, a financial services firm in New York that uses Macintoshes

"Aligning with other industry players, like Microsoft [Corp.] and Next [Software, Inc.] has made me feel more comfortable about Apple's position."
— Michael Purdy, a secondary computer education specialist at the Plymouth Public School District in Plymouth, Mass.

"They need to make people understand that the Mac is a first-class business machine. Apple needs to get this across to people so they know the Mac can easily be integrated into corporate environments."
— Tom Pearson, project administrator in aircraft engineering at Memphis-based Federal Express Corp.

"It is imperative that Apple gets its operations model in sync with the reality of their business. That means getting their production model down to comparable Wintel companies, which means reducing the number of models and building with common parts."
— Charles Wolf, an analyst at Credit Suisse First Boston Corp., a New York investment banking firm

The NCR Scalable Data Warehouse.

Half the world relies on our data warehouses.

If you're serious about using data warehousing to gain a competitive edge, choose NCR. The company that is recognized worldwide as the industry leader. We have the technology and expertise to help you transform mountains of data into nuggets of vital customer information, enabling smarter, quicker decisions.

#1 IN DATA WAREHOUSING

Our **NCR Teradata® database** is the most proven and robust parallel database engine in the industry, providing you with unmatched querying power and scaling from a few gigabytes to 10 terabytes and beyond.

And our **NCR WorldMark™ servers** are the best platform to build your data warehouse on. Ours is the only server platform that scales from SMP, to clusters, to MPP, allowing businesses to start their data warehouse small and grow it to any size.

In the U.S., the 3 biggest retailers, 2 out of 3 top banks, 3 out of 5 top airlines, and 7 of the top 9 telecommunications companies, are already utilizing our know-how. Know-how that has made us the world leader in data warehousing with over 500 production data warehouses. Know-how that can be a big plus in your race to beat the competition.

NCR Worldwide Services professionals can help you set up and maintain the most scalable data warehouse on the planet.

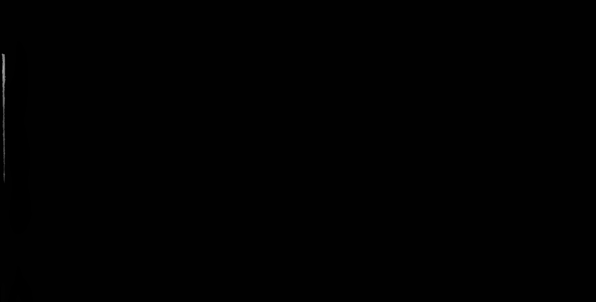
For more information about NCR's scalable data warehouse, call 1 800 CALL-NCR, ext. 3000. Or visit us on the web at www.ncr.com.

intel inside
PENTIUM PRO PROCESSOR

NCR

All WorldMark servers shown feature Intel Pentium Pro Processors. The Intel Inside Logo and Pentium are registered trademarks and the Pentium Processor Logo and the Pentium Pro Processor are trademarks of Intel Corp. Teradata is a registered trademark and WorldMark is a trademark of NCR Corporation. ©1997 NCR Corporation. All rights reserved.

The other is information. Because no trade would ever be made without it. And helping clients manage information—not just process it—is what Unisys does best. That's why Unisys solutions are trusted for the most demanding jobs—like trading over 800 million shares in a single day. Unisys systems support 500 transactions a second, transmitting details to over 3,000 workstations. And Unisys is behind everything from managing a quotation database to maintaining the world's first "electronic trading floor." It's all part of information management—our way of helping you



use information as an asset to gain competitive advantage. Call for details and learn what clients like The Nasdaq Stock Market learned. When it takes information to run your business, it takes Unisys to help you run it better. http://www.unisys.com or 1-800-874-8647, ext. 222

UNISYS

When information is everything.

OPINION

IRS warning Congratulations, IRS. You've set records for IT failure and hubris in project ambition.

The $4 billion price for the IRS' collapsed modernization project goes beyond taxpayer dollars. And it's more than just another blow to the public-image punching bag that has become our government.

The IRS fiasco is a sonic boom that warns any organization that modernizes its computer systems against the Big Bang approach.

Take heed, all you who are working on year 2000 projects. It may be the biggest task you have tackled. Make sure the steps leading to the goal are on track. Take lots of measurements along the way.

That kind of strategy certainly wasn't in evidence in Washington. It's true, agencies such as the IRS should modernize their computers. The Federal Aviation Administration's air-traffic control upgrades are another investment need.

But why can't these people take it one step — maybe $100 million — at a time? Show success on one point before leaping to another?

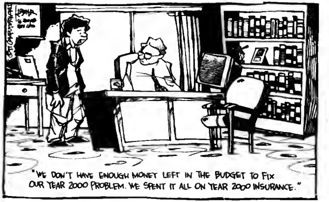
For years, the IRS defended its efforts — and the do-a-dozen-things-at-once approach. Now the agency admits it was all a waste. It doesn't have "the intellectual capital" to fix its problems. It may have to outsource the processing of tax returns.

Are you surprised? Try that kind of grand plan — and cope with an avalanche of technological changes? Keep focused on a bunch of long-range bull's-eyes — and deal with top management turnover? Remain mindful of changing presidents and Congress waiting to call you on the C-SPAN carpet?

Give us a break. The IRS should have stopped this disaster at drawing-board time.

Michael Goldberg

Michael Goldberg, *Assistant sections editor*
Internet: *michael_goldberg@cw.com*



"WE DON'T HAVE ENOUGH MONEY LEFT IN THE BUDGET TO FIX OUR YEAR 2000 PROBLEM. WE SPENT IT ALL ON YEAR 2000 INSURANCE."

LETTERS

Animal geography lesson

In the "HAL is born" story [CW, Jan. 6], Marvin Minsky said, "Just like there are lions and tigers, and they compete for the same antelopes."

Lions are found mainly in Africa, with a few in India. Tigers are found in Asia. Most people mistakenly think that they live together.

Patrick Callahan
Washington

Plea for Finance & Investing

I want to commend you on an excellent newspaper. It is the main publication I read regularly.

But a recent change has disappointed me immensely: the removal of the Finance & Investing section. I thought that was a great section, and I would advise adding it back to your magazine. It is greatly missed.

Rollie Mellberg
Grand Rapids, Mich.

Recruiting starts in-house

As director of marketing for an executive search firm focused solely on the data networking and internetworking marketplace, I read *Computerworld's* "People Who Need People" article [CW, Jan. 13] with interest.

Yes, finding IS talent is difficult in every discipline. But IS executives and managers have worked from employment applications for too long. Gone are the days when a job got posted or an advertisement run in the Sunday paper and hundreds of resumes arrived from which to cull a few good staffers.

IS executives and managers now have to sell the benefits of their organizations to employment candidates. They must profile for success patterns and personality, understand and document position expectations and commitments to employees. They must develop benefit programs, skills improvement plans, flexible work options and employee satisfaction monitoring systems to not only attract but retain valuable IS employees.

If an IS executive cannot sell the value of his or her department to company insiders, what makes them believe they have the skills required to make this "sale" to new recruits?

IS has to sell a firm's benefits to job recruits

Judy Smith
Fast Switch Ltd.
Dublin, Ohio

Windows CE is proprietary

In your Jan. 6 Marketplace article on handhelds, "Handhelds grasp for acceptance," you write: "Perhaps most important, Windows CE will remove a barrier — which was created by the use of proprietary operating systems. . . ."

Please, *Computerworld*, words have meanings. Windows CE is a proprietary system. If you don't believe me, ask Microsoft.

Daniel P. B. Smith
Tewksbury, Mass.

Do it the SAP way or no way

Let me get this straight. After executives have spent millions of dollars to buy SAP R/3 ["SAP recasts R/3 for out-of-the box use," CW, Jan. 6], they need to spend $750 more to find out what they bought? And then they find out that they "must make radical changes in how they do business to get the software's full benefits."

Sounds like "Have it our way" would be a great slogan for this software.

Brandon Musler
Nashua, N.H.

Painful self-promotion

The inclusion of Judith Hurwitz's column on *Computerworld's* Viewpoint page ["Three-tier is passe. Here comes Hyper-Tier!" CW, Jan. 13] highlighting her "trademarked" term "Hyper-Tier" reminds me of something that happened long ago. When I was a preadolescent, all my friends and I use to stand around the school yard trying to think up new dirty words.

Actually, I think that was a more productive exercise than "multitier." Please spare us the pain of reading an obvious self-promotion article. The world outside the computer industry already thinks that we invent a word a day just to confuse.

John O'Brien
Lawrence O'Brien, Inc.
Gaithersburg, Md.

Computerworld welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Maryfran Johnson, Executive Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for verification.

"Don't get left in the dust."

SAVE
OVER
73%

☑ **Yes**, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $39.95* per year - a savings of over 73% off the single copy price.

First Name MI Last Name

Title Company E-mail address

Address City State Zip

Address Shown ☐ Home ☐ Business ☐ New ☐ Renew Single copy price $3.00/issue * U.S. Only. Canada $95 Mexico, Central/South America $150 Europe $295, all other countries $295

Please complete the questions below.

1. BUSINESS/INDUSTRY (Circle one)
- 10. Manufacturer (other than computer)
- 20 Finance/Insurance/Real Estate
- 30. Medical/Law/Education
- 40 Wholesale/Retail/Trade
- 50 Business Service (except DP)
- 60 Government - State/Federal/Local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agriculture
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90 Computer/Peripheral Dealer/Dist./Retailer
- 95. Other__________ (Please Specify)

2. TITLE/FUNCTION (Circle one)

IS/MIS/DP MANAGEMENT
- 19 Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- 21 Dir./Mgr. MIS Services, Information Center
- 22. Dir./Mgr. Network Sys., Data/Tele Comm., LAN Mgr./PC Mgr., Tech. Planning, Administrative Services
- 23 Dir./Mgr. Sys. Development, System Architecture
- 31 Programming Management, Software Developers
- 41 Engineering, Scientific, R&D Tech. Management
- 60 Sys. Integrators/VARs/Consulting Management

CORPORATE MANAGEMENT
- 11 President, Owner/Partner, General Mgr
- 12. Vice President, Asst. Vice President
- 13. Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
- 51 Sales & Mktg. Management
- 70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
- 80. Information Centers/Libraries, Educators, Journalists, Students
- 90 Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply.)

Operating Systems
- (a) Solaris
- (b) Netware
- (c) OS/2
- (d) Unix
- (e) Mac OS
- (f) Windows NT
- (g) Windows
- (h) NeXTstep

App. Development Products ☐ Yes ☐ No
Networking Products ☐ Yes ☐ No
Internet Products ☐ Yes ☐ No

4. Which of the following products do you buy, specify, recommend or approve the purchase of? (Check all that apply.)
- (a) ☐ Internet software
- (b) ☐ Internet browsers
- (c) ☐ Web authoring/development tools

5. Do you use the Internet? ☐ Yes ☐ No

COMPUTERWORLD

B4B7 &

"Don't get left in the dust."

SAVE
OVER
73%

☑ **Yes**, I want to receive my own copy of COMPUTERWORLD each week. I accept your offer of $39.95* per year - a savings of over 73% off the single copy price.

First Name MI Last Name

Title Company E-mail address

Address City State Zip

Address Shown ☐ Home ☐ Business ☐ New ☐ Renew Single copy price $3.00/issue * U.S. Only. Canada $95, Mexico, Central/South America $150, Europe $295, all other countries $295

Please complete the questions below.

1. BUSINESS/INDUSTRY (Circle one)
- 10. Manufacturer (other than computer)
- 20 Finance/Insurance/Real Estate
- 30. Medical/Law/Education
- 40 Wholesale/Retail/Trade
- 50. Business Service (except DP)
- 60 Government - State/Federal/Local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agriculture
- 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90 Computer/Peripheral Dealer/Dist./Retailer
- 95 Other__________ (Please Specify)

2. TITLE/FUNCTION (Circle one)

IS/MIS/DP MANAGEMENT
- 19 Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- 21 Dir./Mgr. MIS Services, Information Center
- 22. Dir./Mgr. Network Sys., Data/Tele Comm., LAN Mgr./PC Mgr., Tech. Planning, Administrative Services
- 23 Dir./Mgr. Sys. Development, System Architecture
- 31 Programming Management, Software Developers
- 41 Engineering, Scientific, R&D, Tech. Management
- 60 Sys. Integrators/VARs/Consulting Management

CORPORATE MANAGEMENT
- 11 President, Owner/Partner, General Mgr
- 12. Vice President, Asst. Vice President
- 13. Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
- 51 Sales & Mktg. Management
- 70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
- 80. Information Centers/Libraries, Educators, Journalists, Students
- 90. Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply.)

Operating Systems
- (a) Solaris
- (b) Netware
- (c) OS/2
- (d) Unix
- (e) Mac OS
- (f) Windows NT
- (g) Windows
- (h) NeXTstep

App. Development Products ☐ Yes ☐ No
Networking Products ☐ Yes ☐ No
Internet Products ☐ Yes ☐ No

4. Which of the following products do you buy, specify, recommend or approve the purchase of? (Check all that apply.)
- (a) ☐ Internet software
- (b) ☐ Internet browsers
- (c) ☐ Web authoring/development tools

5. Do you use the Internet? ☐ Yes ☐ No

COMPUTERWORLD

B4B7 &

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO 55B MARION OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 55B MARION OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

Mortal combat over corporate E-mail

Patricia B. Seybold

Microsoft is engaged in two strategic battles for the hearts and minds of computer users. The outcome of each is likely to affect your future. One strategy focuses on the consumer online market; the other focuses on corporate computing. Both are pivotal to Microsoft's future.

For some time now, Bill Gates has had America Online in his sights. He envies AOL's remarkable ability to create a "branded online community" that lures consumers online. Whether you're an amateur pilot, s chess aficionado or an organic gardener, AOL has a user group for you.

Gates has watched the rise and fall of AOL, and now he's ready to strike. America Online's Steve Case has played right into Gates' hands through chronic inattention to customer service and through the pricing fiasco that generated more demand than AOL can handle.

Microsoft has targeted two key markets: online consumers and corporate messaging.

Microsoft promises to beat America Online at its own game. First, the Microsoft Network (MSN) is now a branded section of the Internet with special-interest groups and services for every major city, including movie and restaurant reviews and lots of local news and sports.

Second, Microsoft excels in customer service. You won't have to wait 15 minutes on an overburdened help line at MSN. Third, Microsoft has invested in an easily extended infrastructure. By outsourcing the MSN plumbing, Microsoft has no capacity constraints. Telephone lines and servers are added as needed to keep up with demand.

Microsoft's second strategy hinges on corporate E-mail systems. What Microsoft has realized in the past six months is that he who owns the corporate E-mail controls the entire account.

Here's how it works. Once an organization decides to standardize on an E-mail package, the dominoes start to fall. After E-mail standardization typically comes the standardization of office applications, so users can attach documents, spreadsheets and databases to E-mail and know that they can be used by the recipients.

Then you'll want servers that can host departmental office applications and local databases and function as World Wide Web servers. Even if you dedicate different servers for different functions, it makes sense to use one operating system on all servers. It creates a more manageable environment. So the E-mail decision scts as the keystone for your entire IS architecture.

That's what Microsoft is betting on. And that's why Microsoft is engaged in a to-the-death battle with IBM/Lotus over corporate E-mail sccounts. The battle is being fought hand-to-hand, one company st a time, throughout the world. This is where Bill Gates pits himself against Lou Gerstner.

Can Microsoft win on both the consumer and corporate fronts? Unless America Online can miraculously upgrade its infrastructure and customer service within three months, Microsoft is likely to be very successful in taking away its customers.

It remains to be seen whether Microsoft can become the premier supplier of online consumer services.

In corporate America, IBM and Lotus are holding their own and giving Microsoft s run for its money. However, Microsoft's product line is much more consistent and unified with Windows NT at its core. The fact that Lotus Notes is a match for Microsoft's Exchange and that Lotus' Domino is a competitive Web server may not be enough to keep the dominoes from falling in Microsoft's favor.

Seybold is president of Patricia Seybold Group in Boston. Her Internet address is pseybold@psgroup.com.

Why we prefer a bumbling IRS

Michael Schrage

As the experts figure it, the IRS has spent — wasted? — somewhere between $3 billion and $4 billion on its ongoing, failed effort to modernize its computer systems. As the late Sen. Everett Dirksen (R-Ill.) once observed, "A billion here and a billion there, and pretty soon you're talking about real money."

This computational money pit reportedly cost the most recent IRS commissioner her job.

No doubt the IRS initiatives to move from mainframes to minis to distributed computing to client/server to — yes! — intranets will make a heck of a Harvard Business School study someday. Multibillion-dollar disasters always make entertaining reading.

But let's imagine a different scenario. Let's picture an IRS that defines the state-of-the-art in information management, data mining, real-time interaction, superb privacy management, instant filings and instant deductions via the Internet … the works.

Let's imagine the IRS as a completely, utterly, ruthlessly efficient agency tracking income and revenues for business and individuals alike. Think about that for a moment.

Did you get the same ominous shivers rippling through your intestines that I did?

A truly effective IRS — an IRS capable of instantly tracking down and computationally enforcing the thousands of pages that make up our tax code — would likely prove a living hell for America. Imagine an IRS audit of every payment you make or receive and every trip to the ATM. Think that lunch or ticket is deductible? The IRS E-mail-of-the-future tells you it isn't. Or your claim will be analyzed by s new artificial-intelligence package designed for people in your income category.

Your business has independent contractors? Almost instantly, the IRS tracks you in real time to see if your hiring practices represent a tax dodge.

How ironic. How perverse. Maybe society is better off with an IRS that lags comfortably behind the IT median. Maybe we don't want our auditors to be *too* efficient and *too* effective.

I'm not excusing in any way, shape or form the hideous mismanagement of the IT function st the IRS.

Then again, you've got to wonder whether there's more going on here than just a government screwup.

The IRS story reminds me of the horrible attrition rate of most CIOs in most organizations. Can so many people be so incompetent? Or, in reality, does the CIO turn out to be not a technology leader but the IT counterpart of the miner's canary?

Don't snicker. There are corporate IT fiascos, too.

Miners' canaries die soon after the fumes of poison gases hit; CIOs get fired soon after the systems they are supposed to implement can't or won't do the job.

But why is that? Because CIOs so grotesquely mismanage expectations and technology? Or because organizations discover thst implementing the systems might have political, organizational and economic implications that they aren't yet ready to manage? You make the call.

There is no shortage of mismanagement in IT in both the public and private sector. But there is also no shortage of organizations that preach effectiveness and efficiency and then take steps to ensure they can be stained. Pathological? Dysfunctional? You bet.

That's the reality for many mission-critical IT projects in the '90s. Just look in your own organizations and deny it.

Schrage is a research associate at the MIT Media Lab in Cambridge, Mass., and author of No More Teams! *His Internet address is schrage@media.mit.edu.*

configure **1**

- **Full-Function Notebook**
- **Lithium Ion Battery**
- **Internal Diskette Drive**

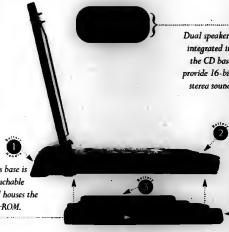
configure **2**

- **Multimedia**
- **CD-ROM**
- **3 Lithium Ion Batteries**
- **16-Bit Stereo Sound**
- **Dual Speakers**
- **NTSC/PAL TV Output**

Detachable lithium ion battery also functions as a handle and a keyboard tilt.

Choice of SVGA displays from 11.3" CSTN to 12.1" CTFT.

Up to 133 MHz Pentium® processor, hard drives up to 1.4GB.



Dual speakers integrated in the CD base provide 16-bit sterea sound.

This base is detachable and houses the CD-ROM.

THE COMPAQ ARMADA 4100. IF IT'S

It's your call. On one hand, it's a full-function notebook. Or in a snap it's multimedia with CD-ROM. Or it's lean and mean. It also fax machines* and dual speakers for incredible 16-bit stereo sound. And it's Internet-ready. The new Compaq Armada 4100. It's how to

©1997 Compaq Computer Corporation. All rights reserved. Compaq registered U.S. Patent and Trademark Office. SpeedPaq and Armada are trademarks of Compaq Computer Corporation. *Speakerphone and answering machine require Compaq SpeedPaq 288 Telephony Modem. Fax machine requires modem. The Intel Inside Logo and Pentium are registered trademarks and the Pentium Processor Logo is a trademark of the Intel Corporation. Other products mentioned may be trademarks of their respective companies.

configure 3

Slimline

5.1 Lbs.

1.5" Thick

configure 4

Rest

Relaxation

Peace of Mind

Memory expandable up to 48 MB.

Touchpad can be replaced by an optional trackball.

Internal diskette drive is replaced by a battery.

NOT ONE THING, IT'S ANOTHER.

provides for three batteries with up to 10 hours of life. It's a virtual office too–complete with a full duplex speakerphone, answering and
conquer the task at hand. One way or another. For more information, call 1-800-853-9521. Or visit our site at www.compaq.com.

COMPAQ

Has It Changed Your Life Yet?

COMMENTARY

Convergence begets conflict

DAVID MOSCHELLA

GIVEN THE ongoing convergence of computers and communications, it isn't surprising that the interests of computer makers and data communications equipment companies are beginning to overlap and conflict. But the stakes this year will become much higher than many customers and investors realize. Consider the case of network interface cards, which have historically been viewed as a minor commodity product.

In recent weeks, network card market leader 3Com has embarked on a Network Ready campaign that allows designated PC suppliers — Dell, Gateway 2000, Acer and 16 others — to configure their PCs with 3Com products. The theory is that because almost all new PCs are networked in some way, PCs should be delivered with whatever capabilities the customer requires. 3Com hopes this program will help expand its lead over archrival Intel. Indeed, it must have been tempting to label the Network Ready initiative "3Com inside."

Preinstalling customer-defined network functions isn't a new idea, but more thorough configurations and testing can provide real value to customers. This integrated approach is particularly well-suited to the build-to-order business model of vendors such as Dell and Gateway. So far, so good.

But notably absent from the Network Ready initiative are IBM, Compaq, Hewlett-Packard and Digital, which happen to be four of the top eight business PC suppliers. All four companies also happen to make network cards, but none is an overall market leader.

3Com's campaign highlights the sharply different strategic positions. 3Com, the top card vendor, has courted many smaller PC companies that don't make network cards. In contrast, the PC companies that make them obviously prefer to sell their own; these companies happen to be some of the industry's biggest enterprise PC suppliers. Intel, which has tremendous influence over all PC companies and is No. 2 in the network interface card market, remains a powerful wild card.

Which way should customers lean? First, you might want to consider the results of *Computerworld*'s recent enterprise network customer satisfaction survey. Responses from about 1,500 users of network cards show that 3Com's customers are considerably more satisfied than those of IBM, Compaq and Digital. But 3Com maintained only a small edge over Intel and finished in a statistical dead heat with HP.

The data suggests that cooperation among 3Com, Gateway, Dell and Acer could work to the advantage of all four parties. Then again, given the close relationship between Intel and HP, future cooperation between those two wouldn't be surprising. IBM has strong networking ties with 3Com, just as Compaq does with Cisco. Digital, like Bay Networks, looks increasingly weak and isolated.

Indeed, as the small-business and remote-access markets explode, it will become increasingly difficult to separate network card competition from the more lucrative router/switch/hub business. Here, converging technologies and standards battles will lead to alliances between computer and data communications companies that make today's network card positionings look like a warm-up act.

Moschella is senior vice president of research at Computerworld, Inc. His Internet address is david_moschella@cw.com.

Computerworld
Custom
Publications

White Papers

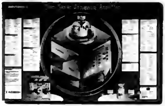
With an in-depth focus on a major technology platform or technology management issue, Computerworld White Papers are highly regarded by information systems professionals

Custom Supplements

Technology briefings that provide strategic direction for the busy IT manager

Technology Roadmaps

Infographic reference guides to the design and implementation of critical technology platforms



Look for These Upcoming Custom Publications in Computerworld

Issue Date	Title	Space Close	Materials Due
Mar. 10	White Paper: Securing the 'Net ..and Your Sanity Distribution at Internet World	Jan 24	Feb. 14
Mar. 31	Solutions Series: Year 2000: Organizational Issues (part 1 of 2).	Feb. 14	Mar. 7
Apr. 21	White Paper: Data Mining Leverages Warehouse Info	Mar. 7	Mar. 28
May 5	Supplement: Electronic Software Distribution Distribution at Networld + Interop	Mar. 21	Apr. 11
May 12	White Paper: Evolution of Systems Management Distribution at DB/EXPO	Mar 28	Apr. 18

Computerworld Custom Publications are written and produced independently of the Computerworld editorial staff.

To order back issues, contact Heidi Broadley at (508) 820-8536

COMPUTERWORLD

Never mind getting ahead of the curve, without the right information you might not even see it.

The right data warehouse can make all the difference.

Staying ahead of the competition means knowing when and where to make your move. To do that you've got to have the right information. The kind you get from an Informix data warehouse solution. Because only Informix can give you all the tools to make the most of managing your corporate information. Which, in turn, leads to better, faster answers and a surer path on the road to success.

Whether you're measuring performance, scalability or extensibility, no other data warehouse solution compares with Informix. And Informix is the only database vendor that offers Integrated Relational OLAP, giving you powerful analysis capabilities on an open architecture that can scale from the smallest data mart to the largest data warehouse. And, despite providing the most advanced data warehouse solution on the market, Informix technology remains as easy to use as ever.

Informix partners with hardware, extraction, analysis tools vendors and systems integrators to provide the very best of breed solutions for your business. Our technology is proven. The leading companies in telecom, finance, retail, insurance, banking and many other industries have all prospered with the help of Informix data warehousing. So can yours. For more information, call **1-800-688-IFMX, ext. 68** or visit our website at **www.informix.com.**

INFORMIX®

Unleashing Business Innovation™

©1997 Informix Software Inc. All rights reserved. The following are worldwide trademarks of Informix Software, Inc. or its subsidiaries registered in the United States as indicated by ® and in numerous other countries worldwide: INFORMIX® Unleashing Business Innovation™. All other company names or marks may be trademarks of their respective owners.

NO OTHER
INSTRUMENT
IS AS STABLE
OR RELIABLE.

EXCEPT,
PERHAPS, A
SWISS WATCH.

Ideal for corporate and large business customers who want stable, reliable, managed personal computing and lower total cost of ownership.

- **RECEIVE INDIVIDUAL CARE** through our award-winning service and support.
- **REDUCE TOTAL COST OF OWNERSHIP** with an affordable, network-ready platform that has the stability to endure over time.

CLIENTPRO M

Intel Pentium processor

- Intel 133MHz Pentium® processor
- 512KB pipeline burst cache, flash BIOS, DMI support
- 16MB EDO RAM
- 1.2GB SMART EIDE hard drive
- 3Com® 3C509 combo network adapter
- 3.5" floppy drive
- Integrated S3® Trio™ ViRGE™/DX graphics accelerator, 2MB EDO RAM
- Integrated Yamaha® (Sound Blaster® Pro compatible) wavetable sound
- 15" Micron 15FGx, .28dp (13.7" display)
- Tool-free minitower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95
- Intel LANDesk® Client Manager
- Microsoft Works preinstalled
- 5-year/3-year Micron Power℠ warranty

$1,699
Business lease $58/month

CLIENTPRO M

Intel Pentium processor with MMX technology

- Intel 166MHz Pentium processor with MMX™
- 512KB pipeline burst cache, flash BIOS, DMI support
- 3Com 3C509 combo network adapter
- 16MB EDO RAM
- 1.2GB SMART EIDE hard drive
- 3.5" floppy drive
- Integrated S3 Trio ViRGE/DX graphics accelerator, 2MB EDO RAM
- Integrated Yamaha® (Sound Blaster Pro compatible) wavetable sound
- 15" Micron 15FGx, .28dp (13.7" display)
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95
- Intel LANDesk Client Manager
- Microsoft Works preinstalled
- 5-year/3-year Micron Power warranty

$1,999 Business lease $68/month

CLIENTPRO 2 180

Intel Pentium Pro processor

- Intel 180MHz Pentium Pro processor
- 256KB internal cache, flash BIOS, DMI support
- 3Com 3C509 combo network adapter
- PCI 64-bit graphics accelerator, 2MB EDO RAM
- 3.5" floppy drive
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows NT® Workstation
- 5-year/3-year Micron Power warranty

- 16MB EDO RAM • 1.2GB EIDE hard drive
- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft Works preinstalled

$1,999
Business lease $68/month

- 32MB EDO RAM • 3.1GB EIDE hard drive
- 17" Micron 17FGx, .26dp (15.8" display)
- Microsoft Office preinstalled

$2,599
Business lease $88/month

Micron Power Warranty & Support

- 5-year limited warranty on microprocessor and main memory
- 3-year limited parts-only system warranty
- 1-, 2- or 3-year optional on-site service agreement for Micron desktop systems
- 30 days of free Micron-supplied software support for Micron desktop systems
- 30-day money-back policy
- 24-hour technical support

The foregoing is subject to and qualified by Micron's standard limited warranties and terms and conditions [illegible] Copies of the limited warranties may be obtained on our Web site or by calling Micron.

Micron Sales Hours: Mon-Fri 6am-10pm, Sat 7am-5pm (MT)
Technical Support Available 24 Hours A Day-7 Days A Week
Toll-free from Mexico: 95-800-708-1755
Toll-free from Canada: 800-708-1755
Toll-free from Puerto Rico: 800-708-1756
International Fax: 208-893-7393
International Sales: 208-893-8970

MMX
intel inside pentium® PROCESSOR
intel inside pentium PROCESSOR
intel inside PENTIUM®PRO PROCESSOR

MICRON
MICRON ELECTRONICS, INC.
800•245•3706
www.mei.micron.com

©1997 Micron Electronics, Inc. All rights reserved. Micron Electronics is not responsible for omissions or errors in typography or photography. All purchases are subject to availability. Prices and specifications [illegible] All sales are subject to Micron Electronics' current terms and conditions [illegible] and MMX is a trademark of Intel Corporation. Microsoft, Windows, Windows NT and the Windows logo are registered trademarks of Microsoft Corporation. All other service marks, trademarks and registered trademarks are the property of their respective companies.

Servers & PCs

Large Systems • Workstations • Portable Computing

Briefs

Q3 1996 Top 5 laptop vendors worldwide
Total units shipped: 3.1 million

Toshiba	22.5%
IBM	11.4%
Compaq	8.6%
NEC	6.9%
Fujitsu	5.6%

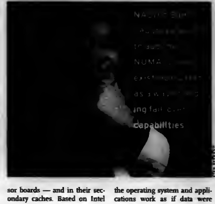
• Sequent aims to outpower SMP

NUMA-Q out of the gate

By Charles Babcock

SEQUENT COMPUTER SYSTEMS, INC. will launch its NUMA-Q architecture tomorrow in New York, and analysts said both the company and its customers have a lot riding on the outcome.

NUMA, or Non-Uniform Memory Access, is an approach to building symmetrical multiprocessing (SMP) servers that is highly engineered compared with machines that use standardized parts. While an SMP server from Compaq Computer Corp. or Dell Computer Corp. might cost $50,000, Sequent's will start at $250,000. Early users said the architecture appears to yield greater scalability and performance.



IT'S ALL IN THE NAME

NUMA gets its name from the distributed nature of the memory in its machines. The memory is located in the four-CPU quads — four-way processor boards — and in their secondary caches. Based on Intel Corp. Pentium processors, Sequent's NUMA-Q uses high-speed hardware tricks to make the operating system and applications work as if data were coming from a common memory pool, as occurs in a single-

NUMA-Q, page 40

MULTIPRISE 2000 FEATURES

- Up to five CMOS processors
- Up to 288G bytes of internal storage
- Continuous power up to 20 minutes after an outage
- Optional cryptographic coprocessor
- Software preconfiguration and installation
- Year 2000 compliance check

IBM touts low-end S/390

By Tim Ouellette

IBM'S MAINFRAMES are still fashionable at Coats Viyella Group's fashion retail division.

And the London-based group uses IBM's "entry-level" mainframe, the Multiprise 2000, to manage all of its international operations.

"Multiprise is the company's central server," said Peter Sparkes, systems support specialist at Coats Viyella. "We've resisted the move to kill off the mainframe and move to Unix."

A big reason Sparkes and others are staying is that Multiprise gives users a relatively low-cost way to maintain mainframe-type processing without buying

IBM, page 40

E
D F N
U Z D T F
P H U N T D Z
N P X T Z F H

EVERYONE IS WATCHING THE BOTTOM LINE.

NOW YOU CAN SEE IT TOO.

As imaging becomes mainstream, budgets and the demands on technology explode. Shouldn't you focus on the monitors engineered to satisfy MIS and finance departments alike? The Nokia 445X series.

Innovative FullScreen™ technology give these 21" systems a full square 19.7" workspace. The 1600 x 1200 wall of pixels boast a dot pitch of just .22 x .16 mm. And the 445X Series can achieve a refresh rate of 150 Hz. In fact, Nokia is the first manufacturer to fulfill the new VESA™ standards for display clarity (which "future-proofs" your decision).

What's more, ergonomic synergies allow the 445X to deliver a range of resolutions and refresh rates mapped precisely to work in the real world.

The result is a versatile tool for a spectrum of high-resolution imaging requirements. Rigorous adherence to new TCO'95, EnergyStar, and MPR-II standards is not compromised. So your contributions to productivity and fiscal responsibility come without trade-offs.

Don't you owe it to your entire organization to consider the 445X series? If you don't, you might consider having more than your eyes examined.

Please visit us at **www.nokia-americas.com** or call us at **1.800.BY.NOKIA, Dept. N216**

NOKIA

AS/400, S/390 shops prepare for native apps

By Tim Ouellette

AS SOFTWARE vendors port their applications to native mainframe and midrange operating systems, S/390 and AS/400 shops can make some adjustments now to get applications on those platforms.

For example, AS/400 users now can run popular applications (such as Lotus Development Corp.'s Notes 4.1) on the AS/400's onboard PC server card.

And because OS/390 — IBM's mainframe operating system — supports Unix application programming interfaces, users can begin porting their own Unix applications to run on the S/390.

MOST SYSTEMS

Those capabilities are important because many firms want to consolidate their multiple distributed PC servers to these more reliable and scalable host systems. They don't have to wait for the native versions and can start immediately.

For example, IBM subsidiary Lotus is porting the AIX version of Domino (the World Wide Web version of Notes) to OS/390 using OS/390's native Unix support.

One S/390 site, Louisiana State University (LSU) in Baton Rouge, will run Domino on its S/390 when it is available in the fall. Until then, programmers are hard at work moving Unix applications over, said Cindy Hadden, LSU's director of administrative information systems.

In March, the S/390 also will support Windows NT applications with software from Bristol Technology, Inc. in Ridgefield, Conn.

On the AS/400 side, RISC-based versions of the midrange system can support up to 16 Intel Corp. 486-based PC processor boards. Users can now run OS/2 versions of applications such as Domino off the server.

Users said advantages include a single log-on to the AS/400 and Integrated PC Server and centralized backups because the server shares the AS/400's disk storage.

But the PC server runs only OS/2 right now, must be managed from a separate PC operator station and must use Open Database Connectivity calls to get at the AS/400's DB2/400 database. Native OS/400 versions of applications such as Domino will be available to directly query the database.

IBM officials said Intel Pentium chips will be added this spring to the Integrated PC Server, and NT will be supported sometime this year.

"We are kind of holding off for Windows NT," said Dee Kellogg, chief information officer at the American Red Cross' Atlanta chapter.

The chapter runs Windows-based reporting software — which presents AS/400 data to users in the Windows format — on a separate PC server but will move it to the AS/400 when Windows NT support is available, she said.

MIRACLE CURE for Data Translation Stress!

netCONVERT solves ALL your cross-platform data conversion problems for VM, MVS, Unix and Windows/NT.

Maps records via COBOL copybook member or manual input.

Supports RECFM=VB, VBS produced by either OCCURS DEPENDING or REDEFINED multiple record types.

JAVA-based GUI, identical on all JAVA enabled platforms.

...from the makers of uni-SPF uni-REXX and uni-XEDIT.

800-228-0255
sales@wrkgrp.com
http://www.wrkgrp.com

wrk/grp
The Workstation Group

NUMA-Q

CONTINUED FROM PAGE 39

processor server.

Sam Laughery, vice president of production systems at the National Association of Security Dealers (NASD), said his Rockville, Md., data center has been using a 12-processor NUMA-Q machine to collect key trading information from its transaction processing systems since Dec. 13. NASD runs the Nasdaq Stock Exchange.

Laughery said he wants to add the server to an existing cluster as a way of adding fail-over capabilities, which he can't do yet.

"They set May as the deadline for clustering. We're hoping to get it earlier than that," said Laughery, who has set his sights on an April delivery date. SMP machines that operate by themselves run the risk of all processors freezing up and losing data if one processor fails. A cluster of systems with fail-over software prevents the freeze-up.

Ron Hawkins, director of information technology at Millipore Corp., said a 12-processor NUMA-Q is replacing the company's two older Sequent systems. The Bedford, Mass., producer of filtration systems now runs 350 users of its Oracle financial applications and manufacturing software on the NUMA-Q machine.

Hawkins said he is concerned that Oracle Corp. hasn't finished certifying its applications as being ready for NUMA-Q. The next release of the applications, Version 10.7, is due in May, he said.

Although Sequent officials seem to like to talk about the possibility of a 252-processor machine, customers must wait until May to get the capability to expand their 12-processor NUMA-Q servers to 16 CPUs.

At NASD, officials said it will be worth the wait. Ed Morgan, director of technical support, said the 12-processor NUMA-Q machine appears to deliver two to three times the performance of a 10-processor predecessor Symmetry model running the same application.

"They've pushed out the scalability fence in a single-image machine," Hawkins said. Both NASD and Millipore found that they could move their application software from earlier Symmetry models to NUMA-Q without difficulty.

THE COMPETITION

Competing NUMA machines are on the way from Sun Microsystems, Inc., based on the SPARC architecture, and Silicon Graphics, Inc., based on MIPS RISC processors. Data General Corp. in Westboro, Mass., also has an Intel-based NUMA server on the market.

Analysts pointed out that Intel has a stake in the NUMA architecture too because Sequent's design represents one of the few ways Intel microprocessors can mount a challenge to the continued reign of the mainframe at the high end of the enterprise computing chain. The Intel high-performance computing division is in Hillsboro, Ore., just down the road from Sequent in Beaverton.

Michael Burwen, a partner at Palo Alto Management Group, a research firm in Palo Alto, Calif., said he believes other vendors, including IBM, will incorporate NUMA designs into their server lines. So far, IBM has relied on a parallel architecture for its RS/6000 SP line, but Burwen said NUMA is a competitive approach because it can incorporate several quads without SMP's usual performance falloff.

IBM touts S/390

CONTINUED FROM PAGE 39

an expensive machine with more power than they need.

Analysts said the system, announced last fall, is aimed at S/390 shops that don't expect to see their mainframe processing needs expand greatly or that want to segregate some applications on a stand-alone machine.

The Multiprise 2000 uses CMOS processors that don't meet the requirements of IBM's high-end S/390 systems but still offer users up to 37 MIPS of processing power in uniprocessor models. The system also comes bundled with optional software packages and services.

"We were introduced to more than just a new machine" when upgrading from our old mainframe, Sparkes said. "We were offered upgrades to the software, maintenance and a whole support package behind it as well."

And IBM last week began shipping an internal disk subsystem with the Multiprise, which analysts said reduces storage costs and is the only such offering in the S/390 line.

"They've stolen a play out of the PC server world," said Mike Kahn, chairman of The Clipper Group, Inc. in Wellesley, Mass. "With Multiprise, IBM is running everything as lean and mean as they can."

Mike Walter, VM systems programmer at Hewitt Associates LLC in Lincolnshire, Ill., said the new machine's environmental benefits alone are a bonus. The Multiprise — the size of an average refrigerator — replaced an older machine that took up much more space and needed expensive cooling systems, he said.

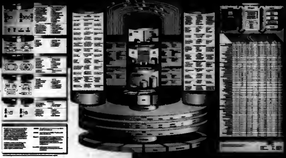
MORE FLEXIBILITY

Sparkes said Coats Viyella also chose Multiprise for its internal open systems adapter, which would support the company's move to a TCP/IP backbone.

With such features in the Multiprise, along with high-end features such as the parallel sysplex clustering found in separate S/390 models, observers said users have more options than ever to buy mainframe processing power.

"[S/390] customers have tremendous flexibility for analyzing workloads and choosing platforms," said John Young, a Clipper analyst. "They don't have to assume anymore that they should throw everything on to one giant machine."

Client/Server "Middleware" Road Map



presented by:

COMPUTERWORLD

developed by:

Database Decisions

sponsored by:

IBM

INTERSOLV

Candle

Hey, throw me the flying disk.

When one brand name becomes the standard, anything else just doesn't sound right. In Middleware®, the standard is INTERSOLV DataDirect. In fact, we own the term Middleware itself. Which might explain why we were the first with server-based Middleware, cross-platform ODBC, and the first with a JDBC to ODBC bridge. To learn more, call 1-800-876-3101.

Connected by
DataDirect

INTERSOLV
www.intersolv.com.

©1996 INTERSOLV, Inc. Other trademarks are property of their respective owners.

Client/Server "Middleware™" Road Map

So many software tools... So much confusion...

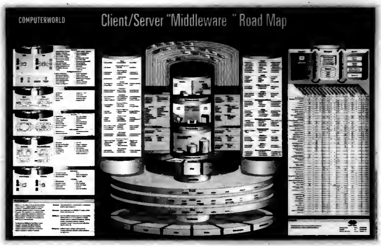
This special White Paper was written independently of Computerworld by Jeff Tash, president of Database Decisions, a division of Hewitt Associates, LLC.

Middleware is responsible for enabling clients to communicate with servers. There are numerous middleware products used to build client/server systems.

An organization's client/server infrastructure is made up of dozens of different types of hardware and software products. The problem is trying to figure out which ones to use for which tasks. This is where the *Client/Server Middleware Road Map* can help.

The Client/Server Middleware Road Map is a visual *infographic* wall poster that helps demystify the complexity surrounding client/server computing by providing a framework that describes the numerous categories of client/server tools. By helping IT professionals think about various product offerings, the framework provided by the Client/Server Middleware Road Map reduces the risk of erroneous product comparisons between "apples" and "oranges."

© 1997, Jeffrey B. Tash Middleware is a trademark of Database Decisions and Hewitt Associates, LLC.



MIDDLEWARE IS A REGISTERED TRADEMARK AND IS USED WITH THE PERMISSION OF INTERSOLV.

"Support from strategic partners such as INTERSOLV is critical to delivering the enhanced power, extensibility and openness of the ODBC 3.0 specification."
MICROSOFT
Nov '96

"INTERSOLV DataDirect ODBC Drivers offer one of the highest performance levels available in the industry."
COMPUTER ASSOCIATES
Jun '95

Connected by
DataDirect
INTERSOLV

"We selected INTERSOLV's ODBC drivers because of their performance, quality and cross-platform support."
LOTUS
Sep '95

"As one of the early proponents of ODBC and open data co INTERSOLV's participat Microsoft in the developm and support of OLE DB is mportant."
MICROSOFT
Sep '96

"By partnering with INTERSOLV to provide the DataDirect ODBC technology, we will offer our users the industry standard and the highest performance levels for data access available."
PROGRESS
Jul '96

"The reputation and performance of INTERSOLV's DataDirect ODBC Drivers and data connectivity solution makes it a clear choice for Sybase Inc., and we are pleased to extend our partnership."
SYBASE
Jan '97

"INTERSOLV's involvement in the development process for the JDBC/ODBC bridge has been vital in rapidly establishing a method of connectivity for JDBC, ODBC and the Internet."
JAVASOFT
May '96

"... the benefits of tight database integration are now available to a wealth of new users beyond the traditional Oracle community."
ORACLE
Aug '96

"Through our partnership with INTERSOLV ... Informix customers are empowered with the cross-platform data access functionality of DataDirect."
INFORMIX
Jun '96

INTERSOLV Connects!

Over 400 software vendors are already "Connected by DataDirect™" for standards-based data access.

Whether it's for the client, the server or the Web, DataDirect scales from the project to the enterprise, with high-performance ODBC drivers, server-based SequeLink® middleware® and Java JDBC technology. Visit us on the Web or call to find out how you too can get connected.

DataDirect... Simplifying Data Access in a Complex World

INTERSOLV®
www.intersolv.com
800-876-3101 ext. 900

Please visit our Web site for the full text of these press releases.

© 1997 INTERSOLV Inc. All rights reserved. INTERSOLV middleware and SequeLink are registered trademarks and DataDirect is a trademark of INTERSOLV, Inc. Other company or product names are the trademarks of their respective owners.

The need for guidelines and structure to describe open client/server computing is widely acknowledged. Numerous vendor architectures have been put forth over the years. Perhaps the most comprehensive is IBM's Open Blueprint. So that IBM products could better interoperate with other vendor's offerings, Open Blueprint was created based around numerous industry consortium standards such as OSF's Distributed Computing Environment (DCE), OMG's Common Object Request Broker Architecture (CORBA), and the Open Group's (formerly X/Open) Distributed Transaction Processing framework. Additional vendor-developed architectures include Microsoft's WOSA (Windows Open Services Architecture), Sun's ONC (Open Network Computing), Netscape's ONE (Open Network Environment), and Oracle's NCA (Network Computing Architecture). The Client/Server Middleware Road Map is a *vendor-independent* architectural framework.

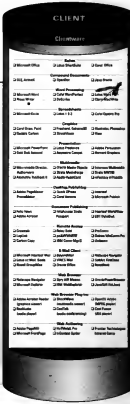
The Client/Server Middleware Road Map describes distributed computing in terms of four classes of products:

1. **Clientware**
2. **Serverware**
3. **Middleware**
4. **Manageware**

Clientware

Any description of client/server must begin with a specification of the client's underlying hardware platform and operating system. Why is the client so important? Because there are millions and millions of clients installed worldwide.

Clientware categories include: suites, compound documents, word processing, spreadsheets, graphics, presentation, multimedia, desktop publishing, remote access, E-mail clients, Web browsers, browser plug-ins and Web authoring tools. Products representative of each category are presented at left.



CLIENT
Clientware
Suites
Microsoft Office
Lotus SmartSuite
Corel Office
Compound Documents
OLE, ActiveX
OpenDoc
Java Beans
Word Processing
Microsoft Word
Corel WordPerfect
Lotus Word Pro
Nisus Writer
BeScribe
Claris MacWrite
Spreadsheets
Microsoft Excel
Lotus 1-2-3
Corel Quattro Pro
Graphics
Corel Draw, Paint
Freehand, Extreme3D
Illustrator, Photoshop
Presentation
Microsoft PowerPoint
Lotus Freelance
Adobe Persuasion
Gold Disk Astound
Asymetrix Compel
Harvard Graphics
Multimedia
Macromedia Director, Authorware
Oracle Media Objects
Strata MediaForge
Asymetrix ToolBook II
Apple HyperCard
mFactory mTropolis
Desktop Publishing
Adobe PageMaker FrameMaker
Quark XPress
Corel Ventura
Interleaf
Microsoft Publish
Document Publishing
Folio Views
Adobe Acrobat
Interleaf WorldView
EBT DynaText
Remote Access
Crosstalk
LapLink
Carbon Copy
Relay Gold
pcANYWHERE
IBM Comm Mgr/2
ProComm
Delrina WinComm Pro
E-Mail Client
Microsoft Internet Mail
Lotus cc:Mail
Novell GroupWise
BeyondMail
VINES Mail
Oracle Office
Netscape Navigator
SoftArc FirstClass
Web Browser
Netscape Navigator
Microsoft Explorer
Spry AIR Mosaic
IBM WebExplorer
Oracle PowerBrowser
JavaSoft HotJava
Web Browser Plug-ins
Adobe Acrobat Reader (graphics viewer)
RealAudio (audio player)
ShockWave (multimedia viewer)
CoolTalk (audio conferencing)
(MPEG player)
Cool Fusion (AVI player)
Web Authoring
Adobe PageMill
Microsoft FrontPage
HoTMetaL Pro
InContext Spider
Frontier Technologies Intranet Genie

Wintel dominates client market

One environment — Wintel — dominates the client marketplace (i.e., Microsoft's Windows operating system coupled with Intel's x86 and Pentium hardware chips). The reason for Wintel's dominance is not because Microsoft's operating systems are so technologically superior. They're not. In fact, for most customers, operating systems are not really all that important. What is important, though, are applications. It just so happens that applications require operating systems in order to run.

The key to Microsoft's success has been its ability to attract independent software vendors (ISVs) to build for the Wintel platform. This poses a huge challenge for hardware and operating system vendors who must compete against Wintel. On the one hand, ISVs prefer to target their clientware products to run on Wintel because most installed client platforms are Wintel-based. On the other hand, customers prefer to purchase Wintel-based platforms because the widest selection of quality software is almost always Wintel-compatible.

It is the third-party products that add value on top of Windows that have propelled Microsoft to its industry leadership position on the desktop. Of course, Microsoft itself has also become a major supplier of clientware applications. Products such as Word, Excel and Powerpoint have become market share leaders in their respective clientware categories. In addition, Microsoft's bundling strategy has

Serverware

Wintel may rule the client side, but on the server side there is still no dominant platform. Instead, intense competition exists among UNIX, Windows NT, NetWare and OS/2 Warp. In addition, many sites are deploying legacy systems as servers (e.g., IBM MVS and OS/400, Digital OpenVMS or HP MPE/ix).

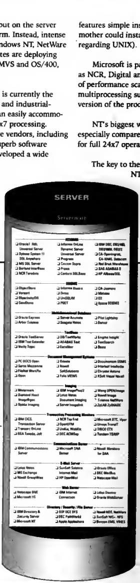
UNIX offers many advantages. It is currently the most open, robust, portable, scalable and industrial-strength operating environment. It can easily accommodate the rigorous requirements of 24x7 processing. It is supported by numerous hardware vendors, including Sun, IBM, HP and Digital. It offers superb software development tools, and ISVs have developed a wide variety of quality products for it.

Microsoft hopes to challenge UNIX with NT. NT's biggest selling points are that it is cheap, compatible with Windows 95 at the API level, and highly portable (NT ports currently run on Intel, Alpha, MIPS and PowerPC processors). NT also features simple installation and administration (your mother could install NT, a claim no vendor can make regarding UNIX).

Microsoft is partnering with hardware firms such as NCR, Digital and Sequent to achieve higher levels of performance scalability than the 4-way symmetrical multiprocessing supported by the shrink-wrapped version of the product.

NT's biggest weakness is its lack of maturity, especially compared to UNIX. It's probably not yet ready for full 24x7 operations.

The key to the success of both UNIX and Windows NT is the rich set of *serverware* commercially available on both platforms. Categories of serverware, which represents the applications that run on the server, include: DBMSs (relational, object, multidimensional and text); document management systems; imaging systems,


SERVER
Serverware
RDBMS
Oracle7, Rdb, Universal Server
Sybase System 11, SQL Anywhere
MS SQL Server
Borland InterBase
NCR Teradata
Informix OnLine Dynamic Server, Universal Server
Progress
Cincom Supra
Centura SQLBase
IBM DB2, DB2/400, DB2/MVS, DB2/2
CA-OpenIngres, CA-IDMS, Datacom
Red Brick Warehouse
SAG ADABAS D
HP Allbase/SQL
ODBMS
ObjectStore
Versant
Objectivity/DB
GemStone
Informix Illustra
Ontos
UniSQL/M
POET
CA-Jasmine
Matisse
O2
Itasca ODBMS
Multidimensional Databases
Oracle Express
Arbor Essbase
Seagate Holos
Pilot Lightship
TextBase
Oracle TextServer
IBM Text Extender
Verity Topic
DB/TextWorks
ADABAS Text
Excalibur
TextSearch
Basis
Document Management Systems
PC DOCS Open
Saros Mezzanine
FileNet WorkFlo
Odesta
Novell SoftSolutions
Folio VIEWS
Documentum EDMS
Chrystal Astoria
XSoft Visual Recall
Imaging
Watermark
Optika Imaging
IBM ImagePlus/2
Lotus Notes Document Imaging
Wang OPEN/image
Novell Image
ZyLAB ZyIMAGE
Transaction Processing Monitors
IBM CICS, Transaction Server
Transarc Encina
BEA Tuxedo, Jolt
NCR Top End
OpenUTM
UniKix, WebKix
DEC ACMSxp
Microsoft DTC, Viper
Unisys TransIT
TIBCO ETX
Tandem TS/MP
Communications Server
IBM Communications Server
Microsoft SNA Server
Novell NetWare for SAA
E-Mail Server
Lotus Notes
MS Exchange
Novell GroupWise
SunSoft Solstice Internet Mail
HP OpenMail
Oracle Office
DEC MailBus
Netscape Mail
Web Server
Netscape ONE
Microsoft IIS
IBM Internet Connection
Lotus Domino
Oracle WebServer
Directory / Security / File Server
IBM Directory & Security Server
Microsoft NT
OSF DCE DFS
DEC PathWorks
Apple AppleShare
Novell NDS, NetWare
SunSoft NIS+, NFS
Banyan ENS, VINES

been enormously successful — the Microsoft office suite of tools has been installed on millions of desktops.

A look at Apple Computer's current business woes demonstrates just how tough it is to compete against Wintel. For years, Apple's Macintosh has been affectionately referred to as the Betamax of PCs. You might recall that originally, in the world of VCRs, Sony's Betamax technology was seen as significantly better than VHS (the technology used by Sony's competitors). Unfortunately for Sony, whenever a customer went into a video store to rent a movie, they found that the most popular titles were available only in VHS format. It didn't take long for people to abandon their Betamax VCRs and replace them with VHS models.

Apple is experiencing a similar problem today. Even though Apple has long been considered the undisputed technology leader in the PC industry — having pioneered the easy-to-use graphic user interface (GUI) and a mouse interface — today the company is fighting for its very survival. Many Macintosh customers are migrating to Wintel. The biggest problem facing the Mac is that the newest and hottest software runs first and runs best on Windows.

This is the same problem that has plagued IBM's OS/2 Warp since its inception. It's a great operating system, but IBM has never been able to attract ISVs to build "killer apps" that run natively only on OS/2.

transaction processing monitors; communication servers; E-mail servers; Web servers; and directory, security and file servers.

Microsoft is banking on the fact that its serverware BackOffice bundling efforts on the NT Server will duplicate its success on the client side with desktop Office. BackOffice includes SQL Server, Exchange Server, SNA Server, System Management Server (SMS), Transaction Server and Internet Information Server (IIS). IBM has countered with a cross-platform family of modular *software servers* that run on AIX, OS/2 Warp Server and Windows NT. IBM's serverware products include DB2, Lotus Notes, Communications Server, Tivoli Management Server, Transaction Server (Encina and CICS), Internet Connection Server and Lotus Domino.

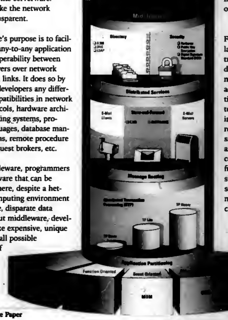
Products representative of each serverware category are listed in the illustration at left.

Middleware

Middleware sits between the clientware and the serverware. Its job is to make the network completely transparent.

Middleware's purpose is to facilitate seamless any-to-any application software interoperability between clients and servers over network communication links. It does so by masking from developers any differences or incompatibilities in network transport protocols, hardware architectures, operating systems, programming languages, database management systems, remote procedure calls, object request brokers, etc.

With middleware, programmers can create software that can be executed anywhere, despite a heterogeneous computing environment and/or multiple, disparate data sources. Without middleware, developers must write expensive, unique code to handle all possible combinations of back-end processing environments.



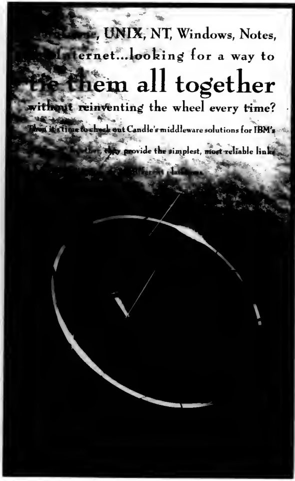
Middleware consists of two key ingredients:
1. APIs — Application Programming Interfaces
2. FAPs — Formats And Protocols

APIs are what programs see. APIs formally define how a programmer invokes a function. Examples of distributed functions include remote file access, remote database access, remote procedure calls, or remote message sending between distributed objects.

The primary goal of APIs is to make the network completely transparent to the developer. For instance, it should make no difference to a program issuing a SQL database call whether the request is physically transmitted over a TCP/IP link or an IPX/SPX connection. Similarly, the middleware should conceal from the developer the target DBMS. Ideally, it shouldn't matter to the calling program whether the SQL request is directed against Oracle, Informix, Sybase, DB2, SQL Server or any other SQL-compliant DBMS server. The middleware's job is to hide low-level, implementation-dependent interfaces, thereby enabling the developer to write interoperable code at a high level of functional abstraction.

FAPs are what networks see. Formats formally define the bit layouts describing the data structures and placement of elemental data fields comprising individual messages. Protocols define the actual physical binary representation of messages that are transmitted across the communication link, including the proper sequencing required whenever multiple messages must be exchanged between a client and a server in order to complete a single, high-level functional request. For example, a single SQL query might require the server to respond by transmitting multiple messages back to the client requester.

Other protocol services include facilities to automatically handle such tasks as datatype translations


[illegible], UNIX, NT, Windows, Notes,
[illegible] Internet...looking for a way to
tie them all together
without reinventing the wheel every time?
Then it's time to check out Candle's middleware solutions for IBM's
[illegible], they provide the simplest, most reliable links
[illegible] different platforms.

With Candle's Solutions fo
you can be
you're maximizing MQSeries' pow
only Candle offers you everything
MQSeries experts to training, testi
[illegible] solutions for your net

Networked Applications,

confident

rful messaging potential. Becaus

rom design by the world's leading

ng tools, deployment, security and

worked applications.

So let's get rolling.

Call for a free demo of our MQSeries Training CD-ROM, and to talk to the Candle Design Network's MQSeries specialists. Simply call 1-888-MQSeries (1-888-677-3743) to take your applications places you never thought possible.

Candle

www.candle.com

between big-endian and little-endian hardware architectures, or datatype conversions like ASCII-to-EBCDIC, or packed decimal-to-floating point.

Middleware is the software responsible for translating APIs into FAPs.

Middleware products fit into three categories of services:

1. Distributed Services
2. Message Routing
3. Application Partitioning

Distributed services provide facilities for an integrated set of directory and security services.

Message routing supports the time-delayed, store-and-forward transmission of data files, especially E-mail documents.

Application partitioning deals with controlling the portion of executable transaction logic that resides on the client, and the portion that runs on the server. Transaction management can be provided by either a DBMS (i.e., TP Lite) or a TP Monitor (i.e., TP Heavy). Applications can be partitioned based on the *fat client* model (data-oriented), *RPCs* (function-oriented), *MOMs* (event-oriented), *ORBs* (object-oriented), or the *thin client* model (screen-oriented).

Distributed Services

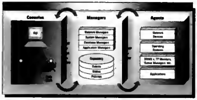
Distributed services refer to those facilities absolutely required to support a network operating system. Distributed services provide an integrated set of directory and security capabilities that are literally zipped together for total cohesion. The directory allows users to refer to resources by name rather than network address. Security ensures that only those users who have specifically been granted permission by the owner of a resource are allowed to access that resource. Unauthorized users are restricted.

Access control can be thought of in terms of a spreadsheet where users correspond to rows and resources correspond to columns. Each intersecting cell of the spreadsheet contains access control rights. To simplify systems administration, distributed services generally allow the creation of groups, or domains, of users and resources.

As client/server computing has matured, standards have evolved. Standards provide the key to building *open systems*. The emergence of a standard reduces risk by minimizing the number of alternative choices, thereby maximizing both portability and interoperability. Portability enables an application to be easily moved from one platform to another. Interoperability provides the coordination mechanism to allow different applications to easily interact. The good news is that directory and security services are becoming very standardized.

Today, there are basically three standards driving directory services. Foremost is the X.500 standard. DNS (Domain Name Server) is the Internet's implementation of directory service. LDAP (Lightweight Directory Access Protocol) makes it easy for any product from any vendor to be able to utilize the services of a directory. Lightweight implies a very thin, simple-to-use API that requires little run-time memory and library disk space.

There are also three basic standards driving security services. *Kerberos*, part of OSF's Distributed Computing Environment (DCE), utilizes a ticket-passing security scheme based on DES (Data Encryption Standard). DES employs a symmetric, shared-key encryption algorithm. For instance, a user who wants to access a network resource begins the process by creating a *request* message. It encrypts the message using the DES algorithm along with a user-assigned shared-key. The encrypted message is then sent to Kerberos.



When Kerberos receives the message, it looks up the user's assigned shared-key in a security database it maintains that contains everyone's user-assigned shared-keys. Kerberos then uses that shared-key along with the DES algorithm to decrypt the message. Next, Kerberos checks its access control database to see if the user has permission to access the requested resource. If so, Kerberos returns to the user a ticket. Half of the ticket is encrypted using the requester's shared-key. The other half is encrypted using the resource's shared-key. Contained in both halves of the ticket is a unique session key that can be used to encrypt the messages that need to be communicated between the client and the server. Note that the Kerberos-issued ticket is then passed back and forth with each message exchange between the client and server.

Kerberos works fine within an enterprise. But its ticket-passing security techniques break down when applied to inter-organization communication. To solve this challenge, users are encouraged to use the *Public-Key/Private-Key Encryption* standard. This encryption technique employs two keys: a public-key that can be published and made available to anyone who wants to access a resource; and a private-key that is never shared with anyone.

In this scheme, a client issues a request by encrypting a message using the server's public-key along with the public-key/private-key encryption algorithm. When the server receives the message, it uses the exact same public-key/private-key encryption algorithm but with its private-key. Think of this approach in terms of a postal metaphor. Once a sender seals a letter inside an envelope, the sender can no longer view the letter. Similarly, once a sender encrypts a message with a public-key, it can not decrypt that message. Only the receiver with its private-key can decrypt the message.

> The main issue with regard to security today is not technical but political

For the public-key/private-key encryption standard to work, a third-party organization must be responsible for licensing keys. The firm that provides this service is RSA, a division of Security Dynamics. RSA currently holds the patents on this technology. The main issue with regard to security today is not technical, but political. Various governments have legal regulations restricting the size of keys that are permitted for use with the public-key/private-key encryption algorithm.

The third security standard is DSS *(Digital Signature Standard)*. DSS allows a user to encrypt their own name using the public-key/private-key encryption algorithm along with their own private-key. Then, before sending the signature message, they take the encrypted text and encrypt it again, but this time using the receiver's public-key. When the message is received, the receiver decrypts the message twice — first using their own private-key, then again using the sender's private-key. If the sender's name pops up, the receiver has total assurance of the message's authenticity.

Message Routing

Middleware associated with *message routing* supports the time-delayed, store-and-forward transmission of data files, especially documents exchanged via E-mail. In many ways, message routing resembles paper-based postal services where a sender drops a letter into a mailbox, and eventually it is delivered to the recipient's address. The letter will typically experience numerous stops along the way as it gets routed from post office to post office before its ultimate delivery.

Like Distributed Services, message routing has become standardized. Again, there are three primary standards. X.400 specifies how messages must be formatted in order to be transported from senders to receivers. X.400 *message transfer agents* handle the movement of documents as they flow across the network. The second standard is SMTP (Simple Mail Transport Protocol), the Internet's implementation of Message Routing. Finally, just as Distributed Services included LDAP to enable applications to access directory services, message routing provides MAPI (Messaging API), which enables applications to interface with message routing services. For example, MAPI makes it possible for a program to output a document as E-mail just as easily as the document could be sent to a printer or fax.

Application Partitioning

The third and most comprehensive set of middleware tools deals with application partitioning — identifying what portion of a distributed application executes on the client and what portion executes on the server. There are five configurations of application partitioning models:

1. *Fat Client*, which is *data-oriented*
2. *RPC*, which is *function-oriented*
3. *MOM*, which is *event-oriented*
4. *ORB*, which is *object-oriented*
5. *Thin Client*, which is *screen-oriented*

Most currently deployed client/server applications were built using the fat client approach. With fat clients, all executable code resides on the desktop PC except for the DBMS. Fat client applications issue SQL requests over the network to back-end relational database engines such as Oracle, Informix, Sybase, DB2, or SQL Server, which then send data back and forth. Fat client communication is provided by remote data access middleware such as ODBC.

A second-generation application partitioning approach divides executable logic between clients and servers. Most implementations of second-generation application partitioning employ a 3-*tier* model where an application is divided into three components:

1. *a presentation layer*
2. *an application layer*
3. *a data access layer*

Essentially, 3-tier takes the fat client's commingled GUI and business logic, and separates them into two modules. Introducing an application layer as a bridge between the client GUI and the server database engine minimizes the cost and complexity of software maintenance. In the fat client model, every software change necessitates that new code be reinstalled to hundreds or even thousands of desktops. But the most frequent maintenance changes rarely involve modifications to the visual objects comprising the GUI, or the DBMS metadata; instead, what repeatedly change are the business rules and business processes. In the 3-tier model, volatile business logic is maintained separately on its own secure, centralized application servers. This makes it much easier to modify application software code without having to update a large number of individual desktop platforms.

There are multiple types of second-generation application partitioning middleware products that support 3-tier computing. These include:

1. remote procedure calls (RPCs)
2. message oriented middleware (MOMs)
3. object request brokers (ORBs)

RPCs redirect subroutine calls transparently across a network. MOMs handle simple inter-program messaging where one program *sends* a message to a second program that *receives* the message. ORBs automatically handle distributed object interactions. Virtually all ORB vendors support the Object Management Group's CORBA (Common ORB Architecture) specifications. The glaring exception is Microsoft, which promotes a non-CORBA-compliant approach called *Distributed OLE*, also referred to as *DCOM* (Distributed Component Object Model).

The thin client approach, where everything runs on the host except the GUI, was originally implemented using screen-scraper and X-Windows technology. Screen-scraping entails intercepting display images formatted for character-based dumb terminal screens. The recent surge of renewed interest in the thin client approach is due to the exploding popularity of the World Wide Web and Web browsers. This new *"anorexic"* thin client model implements GUI using HTML (HyperText Markup Language) embedded into Web pages that are transported across TCP/IP links using HTTP (HyperText Transport Protocol). HTML pages, which are in plain text ASCII format, contain text, graphics and links to other HTML pages.

The thin client model is rapidly maturing. Sun developed the Java language, which can be used to create specialized programs that can be embedded into HTML pages. These *applets* are manipulated using parameters embedded in the HTML. Sun, with Netscape, derived from Java a high-level scripting language called JavaScript that allows programmers to put functions like data entry validation behind the embedded Java applets.

Microsoft recently introduced similar functionality. Its equivalent of Java applets are OLE controls called ActiveXs (formerly OCXs). Visual Basic Script, a stripped-down version of VBA (Visual Basic for Applications), can be embedded into HTML pages to manipulate embedded OLE controls. With Java applets and/or ActiveXs, and client-side scripting, developers can create pages that execute code locally, respond faster and reduce network traffic. Furthermore, with middleware, applets can easily communicate across network links.

As middleware tools have matured, sophisticated communication models have emerged. There are four basic modes of client/server middleware communication:

1. *Request/Reply — Synchronous*
2. *Request/Reply — Asynchronous*
3. *Publish-and-Subscribe*
4. *Store-and-Forward*

The most common form of client/server communication is *request/reply*. Clients issue requests for services; servers reply. With synchronous request/reply, the client process is blocked after issuing a service request. It can only resume execution after the server process responds. Asynchronous request/reply, on the other hand, immediately returns control to the client process. The client subsequently retrieves data from the server either via polling or a callback signaling mechanism.

Message queuing is frequently used to support asynchronous request/reply communication. One advantage of employing message queuing resource managers is their ability to coordinate with DTP monitors. Because they support X/Open's XA-compliant two-phase commit protocol, transaction integrity is assured. Message queuing, especially in conjunction with DTP, holds great promise for significantly increasing client/server scalability.

Traditionally, most RPC, ORB and SQL-based remote data access offerings have supported synchronous request/reply processing exclusively. Conversely, the majority of MOM products have supported event-driven asynchronous request/reply processing. Many software vendors have begun providing both approaches from within a single middleware environment.

Another hot new trend is the emergence of *publish-and-subscribe* middleware products. This paradigm can almost be thought of as *server/client* computing. Unlike request/reply, which is a *pull* model (i.e., clients pull data from servers), publish/subscribe is a *push* model (i.e., servers push data onto clients). With publish/subscribe, a server *publishes* an event by sending a message to an Event Notification Registry. The registry, in turn, sends messages to notify all *subscribers*, if any, who have previously registered an interest in monitoring this particular event.

For example, a Wall Street stock-ticker might publish a trading event such as the sale of 100 shares of IBM. Any subscribing stock trader tracking IBM would automatically be notified of this sales transaction. Publish-and-subscribe can be coordinated with a message queuing resource manager. When combined with a DTP monitor, publish-and-subscribe can ensure asynchronous notification with full transaction integrity.

The publish-and-subscribe model is frequently used by data pumps and DBMSs to handle the task of automatic data replication. These facilities are often used in the implementation of *data warehouses* and *data marts.*

The future of publish-and-subscribe technology looks promising. Combining publish-and-subscribe with Web-based publishing has the potential to produce a compelling new class of "killer" Internet applications.

The *store-and-forward* approach is another type of push model. For example, with e-mail the sender pushes a message to a receiver. Store-and-forward techniques are also being increasingly applied to address the requirements of mobile computing where nomadic client users are *occasionally connected* to network servers. Workflow is another example where store-and-forward techniques are being used to route information and responsibility, based on business rules and policies, from one user application to another.

"Ware" do you want to be today?

The Client/Server Middleware Road Map is part of a series of infographic wall posters developed by Jeff Tash of Database Decisions and published by Computerworld. This road map covers:

CLIENTWARE: client apps — e.g., word processors, spreadsheets, graphics, web browsers, etc.

SERVERWARE: server apps — e.g., RDBMSs, TP monitors, e-Mail servers, web servers, etc.

MIDDLEWARE: tools that facilitate seamless any-to-any interoperability — masking differences or incompatibilities in network transport protocols, hardware architectures, operating systems, programming languages, database management systems, remote procedure calls, object request brokers, etc.

MANAGEWARE: intelligent agents, managers, and consoles for managing enterprises, networks, systems, databases and applications

Other members of the Client/Server Road Map Series include:

ABOVEWARE: software development tools responsible for building the added-value applications that run on top of middleware

Client/Server Aboveware Road Map was published in August 1996 Computerworld Client/Server Journal.

WEBWARE: software products that enable the Internet/Intranet to be used as an organization's client/server infrastructure

Client/Server Webware Road Map to be published in an upcoming Computerworld (first half of 1997).

"Today, DB2 for Windows NT offers a state-of-the-art, enterprise-level feature set and strong performance on almost every front."

–*PC Magazine*, March 26, 1996

Designed for
Microsoft® BackOffice™

DB2® is the Universal database engine for Windows NT.® It gives you a jump on developing video, image, text and audio objects that really perform on Windows NT, and meshes with your Microsoft® BackOffice™ family as no ported engine can. You'll also gain the scalability you need to turn them into a business advantage in a networked wwworld. Your trial copy is free for 60 days and downloadable now at www.software.ibm.com/info/db2nt. P.S. The purchase price is amazingly low.

Not just for IBM, for anybody.

Solutions for a small planet™ IBM.

The IBM home page is located at www.ibm.com. IBM and DB2 are registered trademarks and Solutions for a small planet is a trademark of International Business Machines Corporation. Microsoft and Windows NT are registered trademarks and BackOffice is a trademark of Microsoft Corporation. Microsoft, BackOffice, and the BackOffice Logo are either registered trademarks or trademarks of Microsoft in the U.S. and/or other countries. Quote reprinted from *PC Magazine*, March 26, 1996 © 1996 Ziff-Davis Publishing Company. © 1997 IBM Corp. All rights reserved.

"Sorry, guys.

I think I just

promised

that we'd build a

cathedral

in six months."

Funny how the prize for pulling off a miracle last time is a bigger job this time. Whether it's trying to flow legacy data across your enterprise or tier architectures from clients to top-end servers, our VisualAge™ family provides the proven tools to assemble networked applications from common components. Web parts and Notes™ parts jump-start virtually any project. Developers work in their own languages, but use common tools and one visual environment across platforms, from Windows® to MVS.®

Everything is scalable, which scales up what your team can do as well. Visit us at www.software.ibm.com/ad/visage. Better yet, come to a free VisualAge seminar near you by calling 1 800 426-7914, Priority Code 6C7ADA01.

VisualAge helps

you develop

networked apps

on a larger scale.

IBM.

Solutions for a small planet™

The IBM home page is located at www.ibm.com. IBM's VisualAge products and services are not associated with or sponsored by Visual Edge Software, Ltd. IBM and MVS are registered trademarks and VisualAge and Solutions for a small planet are trademarks of International Business Machines Corporation. Notes is a trademark of Lotus Corporation. Windows is a registered trademark of Microsoft Corp. ©1997 IBM Corp. All rights reserved.

The Road Map Series

Middleware

The Road Map Series was created by Jeff Tash, president of Database Decisions, a division of Hewitt Associates, LLC. Database Decisions specializes in an approach to information technology consulting we call *gestalt computing,* which literally means the whole is greater than the sum of its parts. The Client/Server Road Maps are just one example of this philosophy. They present very complex technical material in an easy-to-understand manner that puts everyone on the same page.

To order Client/Server Road Maps call:
(800) 381-7515

Through consulting and lecturing, Database Decisions helps businesses adapt to new technologies by establishing realistic goals and visions that can be shared by both IS professionals and the end user community.

For additional information on services provided by Database Decisions please contact:

Database Decisions
95 Sawyer Road, Suite 600
Waltham, MA 02154

Phone: (617) 891-3600
Fax: (617) 891-0935
Internet: dbd@tiac.com

presented by:
COMPUTERWORLD

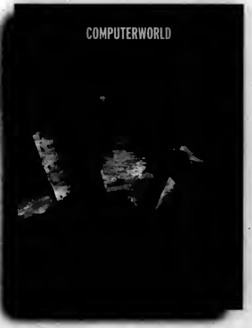
developed by:
Database Decisions

sponsored by:
IBM
INTERSOLV
Candle

DON'T MISS COMPUTERWORLD'S LEADERSHIP SERIES

A Special Monthly Editorial Supplement

COMPUTERWORLD
The Hidden Traps of Transition



TO REQUEST A COPY OF PREVIOUS LEADERSHIP SERIES ARTICLES
Contact Sharon Bryant, Computerworld reprints manager, (508) 820-8125, fax: (508) 875-0733, or email her at sharon_bryant@cw.com. Copies of previous Leadership Series articles are available for $4 each plus postage.

Coming in the February 17th issue of Computerworld...

Align in the Sand

How can technology and business stay aligned despite ever-shifting strategies and endlessly changing technologies? Jerry Luftman, editor of the new book *Competing in the Information Age: Strategic Alignment in Practice* provides an action plan for aligning your IS organization.

Published by:
COMPUTERWORLD
The Newsweekly for Information Technology Leaders

Sponsored by:
HEWLETT PACKARD

New SCO
Internet
FastStart.
$995.

THE WORLD'S MOST AFFORDABLE BUSINESS CRITICAL INTERNET SERVER.

Without SCO® Internet FastStart, deploying Internet access across your enterprise is extremely expensive. FastStart gives you the power and reliability of a UNIX® system at a very low cost. And because it can be deployed on inexpensive Intel® processor-based servers, your hardware costs are lower, too.

FastStart lets you access, publish and conduct business on the Internet. And to share internal information via Intranets. But it doesn't take a rocket scientist to install and maintain.

SCO Internet FastStart Includes:

- **SCO OpenServer™ Enterprise**
- **Netscape Communications Server™**
- **Netscape Navigator™ 2.0**
- **Multi-line PPP and Multi-homing support**
- **Graphic Installation and Configuration Tool**

Don't risk grounding your business with a more expensive, less reliable server solution. Call SCO today.

SCO

1-888-SCO-4YOU
code IFQ396
www.sco.com/ad/IFQ396

SCO, The Santa Cruz Operation, the SCO logo and SCO OpenServer are trademarks or registered trademarks of The Santa Cruz Operation, Inc. in the USA and other countries. UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited. Netscape, Netscape Communications Server, and Netscape Navigator are trademarks of Netscape Communications Corporation. All other brand and product names are or may be trademarks of, and are used to identify products or services of, their respective owners. The Santa Cruz Operation, Inc. reserves the right to change or modify any of the product or service specifications or features described herein without notice. This summary is for information only. SCO makes no express or implied representations or warranties in this summary. ©1996 The Santa Cruz Operation, Inc. All Rights Reserved.

Briefs

[illegible]

[illegible] Tucson, Ariz., is shipping Visual Fax 2.0 for Windows NT. Visual Fax lets developers build applications that send and receive faxes and view and control fax queues on up to 32 simultaneous fax lines. Visual Fax 2.0 works with all Dialogic Corp. GammaLink fax boards. Pricing starts at $495.

HIGH HURDLES

The biggest obstacles to building a data warehouse:

- Poor data quality
- Lack of resources
- Poorly defined goals
- Technical limits
- Poor understanding of legacy data
- Lack of end-user support

Base: 121 companies with data warehouses in place or planned

Source: [illegible]

Oracle packages planning

▸ *Pulls together tools for resource forecasting*

By Randy Weston

ORACLE CORP. and four other software vendors are putting aside their differences to develop a comprehensive software package for the consumer packaged-goods industry.

But the effort may mean more to users than a vendor entering a new vertical market.

It may be the first step to solving the enterprise resource planning (ERP) vs. best-of-breed debate many users face when deciding what kind of software to buy.

"ERP won [the debate]. SAP showed that," said Adam Thier, an analyst at Meta Group, Inc. in Stamford, Conn. "People wanted to buy in to a consistent set of tools for their organization. Now ERP vendors want to supplement their product with best-of-breed software where needed, in specific cases for specific industries." The consumer packaged-goods business is one such industry.

For the hybrid enterprise and best-of-breed software package, Oracle took its own financial and manufacturing modules and added applications from Manugistics, Inc. in Rockville, Md., Industri-Matematik International (IMI) in Tarrytown, N.Y., TSW International in

Oracle, page 44

Components of Oracle's [illegible]

Company	Component	Purpose
Oracle	Financials	Fixed assets, [illegible] payable
Oracle*	Process manufacturing	[illegible] formula, costing, manufacturing resource [illegible], raw materials inventory, quality control, [illegible] finished goods inventory
Manugistics	Logistics/ planning	[illegible] resource planning, distribution, transportation, [illegible] scheduling
IMI	Order management	[illegible] goods inventory, picking/shipping, invoicing, [illegible] orders, pricing and promotion
IRI	Sales and marketing	[illegible] analysis, product management and demand [illegible], scanner data
TSW	Plant maintenance	[illegible] inventory, operations, scheduled maintenance

* [illegible] by Datalogix, which Oracle bought last year.

Gotcha! Con games on the Internet

By Sharon Gaudin

COMPANIES ARE putting their identities up on the Web. And although they are trying to use the World Wide Web to bolster their business, they also are taking the chance that someone will use the Web against them.

Con games can be played on the Internet as easily as on a side street. Hackers can spoof a corporate Web site, intercept financial or corporate information or enter a protected site under the guise of someone else. One way to foil such games is to build authentication capabilities in to an application.

"I'm building a site for the whole university, and a major concern is knowing that your transactions on the Internet are secure," said Joseph Kerr, director of information management and technology at the State University of New York at Buffalo.

Spoof-proofing, page 44

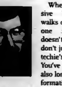
FRANKLY SPEAKING

The Great Brain Heist

FRANK HAYES

EVERY NOW and then, vendors get a taste of what life is really like for corporate IS shops.

Case in point: A few weeks back, Informix Software discovered that nearly a dozen of its top developers had quit to take jobs at Oracle.



Informix cried foul — and filed suit — over this Great Brain Robbery by its big rival. The lawyers will be sorting it out for months or even years. But based on the early line, it looks like Informix is out of luck — just like any IS department that hires top talent in a hot new technology and then discovers how hard it is to hold on to those people.

Whether you're building intranets, electronic commerce or data warehousing, it's the same problem. Technology changes so fast that the demand for technical experts in new areas far outstrips supply. That means good people are hard to find, expensive to hire and almost impossible to keep.

It's a problem that will just get worse. And there isn't much you can do about it.

When an expensive hired gun walks out the door one night and doesn't return, you don't just lose that techie's talents. You've probably also lost a lot of information about how your systems work and what your organization needs.

That information isn't of much use to the former employee. But it *is* valuable to you, whether it's business rules, user preferences, promises made, project ideas, odd little bug fixes or irritating problems yet to be fixed.

Hayes, page 44

Java apps serve up flexibility

By Lisa Picarille

BY MOUNTING one of the largest Java efforts in the software industry, Lotus Development Corp. hopes to deliver a set of Java-based productivity applets by the summer.

Lotus has been talking about the concept of delivering a set of business applications written entirely in Sun Microsystems, Inc.'s Java language since Comdex/Fall '96 in November. At last month's Lotusphere — the company's annual user conference — Lotus for the first time demonstrated its Java-based suite.

Code-named Kona, the set of Java-based productivity applets includes a spreadsheet, text editor, chart builder, calendar,

Java, page 44

Lotus has [illegible] decide [illegible] for Kona

Oracle offers tools for consumer goods

CONTINUED FROM PAGE 43

Atlanta and Chicago-based Information Resources, Inc.

Each of those other vendors produces what many analysts said is the best software in their respective fields (see chart, page 43).

George Van Ness, Oracle's vice president of industry applications, said the company sought to break down barriers among competitive vendors to integrate the best software components.

Oracle sought to break down barriers among competitive vendors

"You achieve that by each vendor using the other as experts instead of competition," Van Ness said. "It meant IMI stopping short of using its scheduler and instead installing Manugistics' product because it is a better scheduler."

First Brands Corp., a $1 billion consumer-goods maker based in Danbury, Conn., is an early user of Oracle's package. First Brands makes products such as Glad trash bags.

A. R. "Bud" McClellan, assistant controller at First Brands, said the company was using Manugistics' mainframe application for supply chain management and wanted to keep the functionality of this application. But First Brands also was re-engineering its Glad division and wanted an enterprisewide client/server package.

After evaluating about 27 vendors, including SAP AG, PeopleSoft, Inc. in Pleasanton, Calif., and The Baan Co. in Menlo Park, Calif., McClellan said Oracle seemed the obvious choice, even if the Oracle piece wasn't the deciding factor.

"We looked at Oracle because of the best-of-breed approach," McClellan said.

"IMI was something we heard about and were interested in, and we wanted Manugistics client/server software. We didn't know much about [Oracle Manufacturing], and [software for] financials are not going to drive anyone's [buying decision]," he said.

Hayes

CONTINUED FROM PAGE 43

The trouble is, after that techie is gone, the information is out of reach.

What can you do? Something you should have started to do a long time ago: Get that information out of your techies' heads and on to paper. Or even better, into electronic form.

A system of tools, rules and jewels can make your developers and operations people more effective individually as it reduces your dependence on each individual.

Invest in tools that make them more efficient and effective, tools for systems management, development and documentation. Then set up rules specifying that as much information as possible about your systems, processes and user needs — the jewels — must be documented.

Once you've got that information in a single place, you can and should use it for almost everything. Train new people with it. Track your performance. Get answers without having to wake up overworked techies on the weekend.

Make sure your people keep it updated so it stays useful. If it doesn't get used every day, it will quickly fall out of sync with what's actually going on in your organization.

You'll probably have to piece together a system to store this information yourself. Most commercially available repositories right now were designed just to store information about software development — and that's nowhere near enough.

You want it to hold everything from operational logs to meeting notes and blue-sky ideas. And you want it to be available to everyone in your shop.

If you're worried that such valuable information should be locked away, just remember — right now, it is. It's locked away in the heads of employees who could walk out the door tonight and not come back.

Hayes is Computerworld*'s staff columnist. His Internet address is frank_hayes@cw.com.*

The following productivity suite providers are jumping on the Java bandwagon:

	Lotus	Corel
Product	Code-named Kona	Corel Office for Java
Description	A set of individual applets written in Java	Some of Corel's current suite offerings rewritten in Java
Includes	Spreadsheet, text editor, chart builder, calendar, personal information manager	Spreadsheet, word processor, presentation package, charting, business graphics, calendaring/scheduling, address book, E-mail
Availability	This summer	This spring
Pricing	To be determined	To be determined

Java productivity apps

CONTINUED FROM PAGE 43

personal information manager, electronic mail, presentation graphics application and project scheduler.

Because the applets are written in Java, they can run on any platform that has a Java Virtual Machine, including World Wide Web browsers that support Java, network computers and Lotus Notes clients.

Lotus hasn't decided on pricing, but company officials said Kona applets will be available to developers as building blocks for creating applications. A version of Kona also is expected to be sold to end users, according to Brian Anderson, product manager of Lotus Components.

The Java-based Kona applets could give Lotus' software efforts a needed shot in the arm. Despite of a year of aggressive bundling deals, Lotus' SmartSuite has gained only a few percentage points on Microsoft Corp.'s best-selling Office suite.

Office's market share of suites fluctuates between 80% and 90%, depending on which competitor announces an upgrade or releases a new version. Lotus ranks second, and Corel Corp.'s Corel WordPerfect Office is usually in third place, according to Dataquest, a market research firm in San Jose, Calif.

Jeff Lewczyk, a systems developer at the Division of Laboratories of the Connecticut Department of Public Health in Hartford, said he is interested in the Kona technology. He said his agency, which has 4,000 Office users and only pockets of SmartSuite users, is unlikely to embrace Java applets right now.

"As a government agency, things move slowly," Lewczyk said. "But the time is coming when we will not only be creating data but delivering data online. And I could see where having this type of technology would make it much easier for our users to interface with an intranet or the Internet without having features in their suites that they don't need."

Industry watchers said Java's cross-platform capabilities provide an opportunity for Lotus and Corel to make some inroads with users who don't need the full power or memory of traditional desktop suites.

Corel was the first to bet big on Java, with plans announced as early as last summer. Corel Office for Java, now in beta release, is due in the spring. Microsoft officials have said the company doesn't plan to rewrite Office in Java, although the program will support Java. Microsoft continues to push its ActiveX component plan.

"Microsoft has a stronghold on the desktop, and chances of [Java-based applets] impinging on that is low," said Chris Le Tocq, a Dataquest analyst. "But Lotus and Corel could do well on the Java platform depending on how well Java itself is accepted. Right now, they are rolling the dice."

Spoof-proofing Web sites

CONTINUED FROM PAGE 43

"A piece of that is protecting against spoofing. We need to know who we're talking to at all times," Kerr said.

The university uses Gradient Technologies, Inc.'s new WebCrusader 2.0 to foil Internet intrusions at his site, which is slated to go up this spring. The site is expected 50,000 users. WebCrusader is used during the application development process to build authentication capabilities in to each program.

The definition of spoofing varies, but the threat it poses doesn't. Some analysts and users say spoofing occurs when a hacker accesses a site through someone else's server, using the other identity to gain access. And others say spoofing is putting up a server that will intercept transactions at an official site. Both definitions point to an unauthorized person gaining access to take or change information on a corporate Web site.

PROFESSIONAL ESPIONAGE

"As more and more corporations get on the 'net, there are professional spoofers out there who are getting paid to get corporate information," said Joel Maloff, president of The Maloff Co. in Dexter, Mich. "Industrial espionage is not new. This is just a new tool."

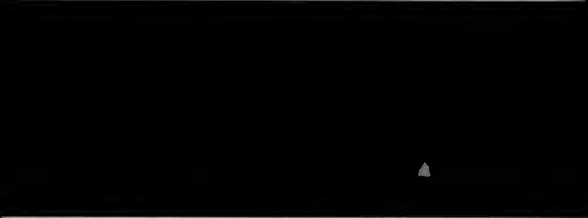
Maloff said there aren't any specific numbers on how frequently companies are spoofed, mainly because many companies aren't aware of it or are too embarrassed to report it. "It is on a growth curve because the industry is on a growth curve," he said. "Most companies don't have a written security plan, so most aren't protecting themselves very well."

Ezra Gottheil, an analyst at Hurwitz Group, Inc. in Newton, Mass., said a lack of numbers doesn't detract from the seriousness of the potential problem.

"Security only becomes an issue once you've been hit, and some people regard it as high comedy to disrupt your life," Gottheil said. "Gradient is getting at the problem. It's a security layer right in the application. It also addresses the issues of convenience and simplicity."

LAWSON™

The good news about our
Web-deployable software is that you can
set up an office anywhere.



(The bad news is, we mean anywhere.)

©1996 Lawson Software.

LAWSON INSIGHT™

Business Management System makes networking new locations and remote or mobile employees as simple as adding browser software. End users will have instantaneous access to our world-class financials, human resources, procurement and supply chain process suites without sacrificing functionality. And, for the first time, Mac and PC workstations can access the same databases. All this, at a fraction of the cost of maintaining a wide-area network. And our open licensing policy lets you migrate through future technological changes and upgrades without additional licensing fees. LAWSON INSIGHT. *Because the future can't wait.*

TODAY YOUR NETWORK IS A TARGET.

INTRODUCING BULLETPROOF SECURITY.

Only McAfee Security Suites provide complete protection.

Most computer security breaches are committed by employees.
—1996 FBI Computer Crime Survey

To protect your network these days, you have to protect each *part* of the network—the perimeter, servers, desktops, even network traffic. That's because today's intruders can infect, penetrate, eavesdrop and sabotage nearly any element on your network.

Even your employees are a danger. In fact, according to the 1996 FBI Computer Crime Survey, most network security breaches are committed by the very people who walk past your firewall every day.

Guards against all network threats. Both outside *and* inside.

McAfee's unique new security suites provide all the tools you need to fully defend your network. Everything from perimeter and desktop firewalls to anti-virus and encryption.

PC Firewall™ protects desktops against unauthorized access by outsiders *and* employees. It also denies unauthorized connections to the Internet, thus preventing back-door access to your network.

SecureDesktop combines the industry's best-selling and most effective anti-virus software with two types of industrial-strength encryption. One transparently encrypts all traffic across TCP/IP networks. The other secures files, e-mail and attachments, even if the receiver doesn't have the same encryption software

FIREWALL
DESKTOP

McAfee Security Suites protect every part of your network —perimeter, servers, desktops, even network traffic

SecureGateway integrates network anti-virus with a perimeter firewall for maximum network-wide protection. Based on McAfee's #1-rated detection engine, the anti-virus automatically scans e-mail, FTP and HTTP file transfers and traps viruses before they can infect the network. And the perimeter firewall bars hackers from gaining access and filters out unwanted Internet activity.

yes
It runs with NetWare

To order or to receive the free McAfee Security CD with actual working software, call **1-800-332-9966** today. We've got you completely covered.

MCAFEE
Network Security & Management

[illegible] www.mcafee.com ftp:mcafee.com BBS: (408)988-4004 America Online: MCAFEE CompuServe: GO MCAFEE

Telephone (408)988-3832 Fax (408)970-9727 © McAfee Associates, Inc., 1996 All rights reserved. All brands and products are trademarks of their respective holders

The Enterprise Network

LANs • WANs • Network Management

Briefs

MailBridge for NT, AIX

[illegible] International LLC in New Canaan, Conn., is shipping versions of its Golden MailBridge electronic-mail translator for Windows NT and IBM's AIX. The software, which links legacy, LAN and Internet mail systems, was previously available only on OS/2. Pricing starts at $5,990.

Meeting Maker on NT

On [illegible] Corp. in Cambridge, Mass., is shipping Meeting Maker 4.0, a version of its client/server scheduling software that runs on Windows NT servers. It has a [illegible] feature that provides [illegible] view into multiple schedules. Pricing for Meeting Maker 4.0 starts at $9,995 for a bundle that includes client and server software.

Pac Bell touts ADSL

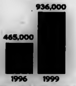
Pacific Bell plans a limited rollout of two Asymmetric Digital Subscriber Line (ADSL) services in the fall: one for consumers and small businesses and the other for telecommuters who connect to corporate LANs. Pac Bell will charge a flat rate of about $100 for telecommuters who access the 'net through an employer's LAN.

A PLACE FOR NT

Windows NT won't threaten Unix, but it will dominate in these areas:

- **Client/server E-mail upgrades**
- **Migration from NetWare and OS/2**
- **Building intranets**

Windows NT shipments are projected to increase because of those dominant areas:



Source: Forrester Research Inc., Cambridge, Mass.

HP changes OpenMail mission

▸ *It's now a backbone, with support services*

By Barb Cole

HEWLETT-PACKARD CO. hopes to breathe new life into its messaging business by pushing its software and services as a way to shore up weaknesses in its competitors' mail systems, *Computerworld* has learned.

HP is betting that companies eyeing the new crop of client/server messaging systems will look at HP OpenMail as a mail backbone able to handle large volumes of users and messages by linking different electronic-mail packages and synchronizing directories.

The repositioning will put OpenMail in a supplemental role and take it out of direct competition with Microsoft Corp.'s Exchange and Lotus Development Corp.'s Notes. But HP could face an uphill battle because many companies are looking to standardize on one messaging platform.

"We've used [additional] backbone technology with Exchange and are really trying to get away from that," said Brian Leonard, a senior business analyst in the emerging technologies group at Carolina Power & Light Co. in Raleigh, N.C. The utility is rolling out Exchange to 6,000 users. Leonard said the biggest obstacle to scaling Exchange is

HP changes, page 48

HP's OpenMail

- Can support thousands of users per server
- Consistent uptime
- Integrated with HP OpenView management platform

Users indifferent to Unicenter 3-D

Unicenter TNG's Real World includes a Unispace view that breaks networks down by business processes and functions

By Craig Stedman

THE MOST noticeable feature in Computer Associates International, Inc.'s Unicenter TNG management software is its 3-D user interface. But whether the interface actually is useful is in the eye of the beholder.

Beta testers and prospective users had mixed reactions to the optional interface, which lets systems managers zoom through three-dimensional renderings of their data centers and networks — even to the point of going inside individual machines to check on different components.

Unicenter TNG, page 48

IRS goes wireless to fight diesel fuel tax fraud

By Mindy Blodgett

IN THE BATTLE against tax fraud, one Internal Revenue Service division has decided to use wireless mobile communications as a weapon in the arsenal of field agents.

The IRS' diesel fuel program has implemented a wireless mobile computing system nationwide for agents who track diesel fuel tax fraud.

The IRS implementation is part of general trend in which mainstream corporate functions

IRS, page 48

Network connects agents to tax records during inspections

NT SERVER 5.0

NT users eye enhanced directory

By Laura DiDio

IF MICROSOFT sticks to its published schedule — and some cynics are betting it won't — Windows NT Server 5.0, code-named Cairo, and its advanced Active Directory will ship by year's end.

The Active Directory is Microsoft Corp.'s full-blown enterprise services mechanism. It was designed to remove the limitations of the current domain name services (DNS) in Windows NT 3.51 and 4.0 and ease NT Server administration on an enterprise level. It is slated to support several standards that allow electronic-mail and other directories to share user information, including X.500 and the Internet Engineering Task Force's Lightweight Directory Access Protocol.

"DNS is not a true wide-area X.500 standards-based directory, and it's been the one big, ongoing weakness that hampers Windows NT Server's scalability and deployment as an enterprise server in Fortune 500 accounts," said Jon Oltsik, an analyst at Forrester Research, Inc., a consulting firm in Cambridge,

NT users, page 48

NT users eye directory revamp

CONTINUED FROM PAGE 47

Mass. "Ideally, that will all change when the Active Directory ships with Windows NT 5.0 at year's end."

Users said they hoped so.

Ted Kull, manager of LAN systems operations at the Educational Testing Service in Princeton, N.J., said Microsoft would do "everyone a big favor if they deployed a real directory."

He said Microsoft's Active Directory White Paper discusses the software in the present tense. "In reality, it's a pre-alpha product. And I have no intention of abandoning good sense and doing a wide-area Windows NT Server rollout until I'm certain Microsoft has nailed it down," he said.

Microsoft officials said the proof is in a raft of advanced features, but as yet only a handful of developers has seen or tested the upcoming Active Directory.

The latest version of an oft-changed feature list is the ability to create extensible schemas — the format and types of information stored in the directory. It was designed to let users link various corporate directories without scrapping the products that produced the directories.

Another facility much hyped by the Redmond, Wash., company is the Microsoft Management Console, a Windows-based management administration tool that can be used to monitor all the directories across an enterprise.

A feature called Dynamic DNS is supposed to let businesses use the Internet's DNS to find the numerical IP address by looking up its common name.

By contrast, current implementations of Windows NT DNS servers require administrators to manually update host names and IP addresses.

Finally, Microsoft officials said the Active Directory will support up to 10 million objects per directory database, far more than the 40,000-object limit they claim for the current DNS.

But an information systems manager at a large New York-based brokerage firm who requested anonymity said seeing is believing. "We're just not switching to Windows NT Server until I see the Active Directory, test it and be sure that it works. I've grown tired of listening to Microsoft talk about Cairo for the last three years; let's see the proof," he said.

Features of Windows NT 5.0's next-generation Active Directory include:

- **The Microsoft Management Console**
- **A Web-based interface for querying and managing directories**
- **Active Directory Services Interfaces APIs**
- **Dynamic DNS**
- **Kerberos-based security model**
- **LDAP support**
- **Multimaster replication support**

Unicenter TNG goes 3-D

CONTINUED FROM PAGE 47

Some users said the gamelike Real World interface should make it easier to track their networks by visualizing problems and other events. But others said they expect the 3-D capabilities to be useful more for catching the eye of senior executives than for doing down-and-dirty administrative work.

Doug Walker, assistant director of financial computer support at Brigham Young University in Provo, Utah, said he hopes to get better central control over his network by upgrading to Unicenter TNG (The Next Generation).

The original Unicenter was primarily a systems management tool. Unicenter TNG, which CA shipped late last month, was designed to provide end-to-end management of systems, networks and applications. It includes built-in automation agents and lets users see how problems affect business processes [CW, Feb. 3].

CA's promises that Unicenter TNG will manage Brigham Young's databases and "tell us where the problems are" across the school's network sound great, Walker said. "But I couldn't care less about flying around in my network," he added.

The 3-D support "is a glitzy thing, but I'm not sure it's going to help me get my job done," Walker said. "That sells [upper] management, not the hard-core guys who do the work." Sending 3-D graphics to remote administrators also might clog communications lines, he said.

Don Resh, a senior vice president and the chief information officer at Retired Persons Services, Inc. in Alexandria, Va., also said the 3-D interface's value mostly lies in helping to sell the benefits of Unicenter TNG to executives.

"If I show them a graphical view of our financial systems and where the bottleneck is, they walk out of the room wanting to know how quickly they can cut a check to fix things," Resh said. Retired Persons Services, which runs a mail-in pharmacy for members of the American Association of Retired Persons, is beta-testing Unicenter TNG.

CA officials said they expect most Unicenter TNG customers to implement the Real World interface to some degree, but users can also opt to stay with two-dimensional or command-line interfaces.

Michael Jaslowski, a senior project manager at Allstate Insurance Co. in Northbrook, Ill., said he was skeptical about the 3-D. "But just like with a new car, it turns out that a Porsche is nicer than a Chevette," he said.

IRS moves to wireless system

CONTINUED FROM PAGE 47

such as sales are increasingly using wireless communications.

Until recently, most wireless mobile programs were relegated to specific functions such as field service, warehouse inventory tracking and transportation.

"Wireless is still targeted at the vertical applications, but we are definitely seeing more uses such as general field sales, consulting and real estate," said Dan Merriman, an analyst at Giga Information Group, Inc. in Norwell, Mass. "We are still not talking about general-purpose mobile professionals here. But mobile professionals who place a high value on speed of communications are using wireless."

CONNECTED

Using Oracle Mobile Agents software from Oracle Corp. in Redwood Shores, Calif., and a wireless mobile system designed by Aris Corp. in Seattle, about 150 IRS agents use laptops from Compaq Corp. in Houston and handhelds from Hewlett-Packard Co. in Palo Alto, Calif., to log discrepancies and complaints, settle fines and access the IRS' main database.

All diesel vehicles and diesel fuel stations are subject to inspection by IRS compliance officers. The inspectors check vehicles for untaxed gas at weigh stations or at truck stops — and they check the pumps, too.

The new IRS mobile wireless setup has 150 mobile users and 40 managers on the networked system.

Prior to the implementation of the program, field agents lugged extensive files and data on the road, according to Roy Lively, an excise program analyst at the IRS. The agents — who inspect stations that sell diesel fuel and the vehicles that use it to ensure that the proper taxes are being paid — had to sort through paperwork while making inspections and then mail in information.

Lively couldn't give a total cost of the project, which was rolled out in July. But he said, "We definitely think it was worth it, and in the end we will save money." The users also have cellular hookups to the laptops for wireless access to file reports and to access the Oracle Mobile Agent on the data server. The palmtop computers are used to record site locations, license plate numbers and other information.

Iain Gillott, an analyst at IDC/Link in Austin, Texas, said implementations such as the IRS program that use middleware such as Oracle Mobile Agents are likely to be replaced in the future by personal communications services systems.

But in the meantime, Lively said, the wireless system saves agents valuable time, although the IRS is still collecting data to demonstrate productivity gains.

HP changes OpenView mission

CONTINUED FROM PAGE 47

the 16G-byte limit on the server's message store, something that he will "wait for Microsoft to fix later this year."

The HP plan, to be detailed this quarter, is expected to include an OpenMail upgrade that boasts new application messaging technology similar to IBM's MQSeries message-oriented middleware.

Sources close to HP said the company is working on plans to offer consulting and support services to organizations looking to deploy Exchange across an enterprise. That could be fertile ground for HP to sell its mail backbone because Exchange early adopters have faced hurdles in getting the client/server messaging system to scale.

Officials at HP in Palo Alto, Calif., declined to comment.

OpenMail is the dominant vendor in the Unix E-mail space. It can support up to several thousand users on one server. In comparison, Notes and Exchange support about 1,000 and 500 users per server, respectively.

OpenMail's scalability appeals to organizations that are looking to move off LAN-based mail systems but aren't confident that Notes and Exchange can handle their messaging load. One such organization, NationsBank Corp., recently migrated several thousand users to OpenMail from Lotus' CC:Mail and will run HP's messaging servers in concert with a growing Notes network.

"[HP] is sticking with what it does best: providing a high-performance messaging server that can be run stand-alone or as a supplemental backbone to other mail systems," said Mark Levitt, an analyst at International Data Corp. in Framingham, Mass.

Run your mission-critical business processes

generate comprehensive audit trails

maintain version control

manage your workflows

collaborate in global teams?

Introducing Livelink™ Intranet Suite 7.

It's the first and only intranet application suite that you can run your business on.

Managing today's complex business processes means allowing your managers and project teams to access, share, track and reuse information across your corporation – no matter how many sites and technologies are involved. With Livelink Intranet you can manage documents, collaborate on projects and coordinate workflow. And quickly find what you need using the world's top-rated full-text search engine. It links your people with people, and people with information, to meet your goals.

Livelink Intranet is a complete off-the-shelf application that you install and start using right away – all your people need is a Web browser. It takes your current investment in networks, databases and applications and integrates them with the Internet's global infrastructure. Finally, your intranet will support document collections of any size and handle any number of users. All with the necessary security and access control.

> *"Livelink was exactly what our company was looking for...we looked at a lot of products and of all of them, Livelink was the most open and easiest to use."*
>
> **Mitch Oliver, QUALCOMM Incorporated**

Industrial-strength and scalable, Livelink Intranet helps Fortune 500 and Global 2000 companies solve advanced business problems.

And it's the only one that can, and the only one that's shipping today. Contact us and we'll show you how.

Visit www.opentext.com
or call 1 800 499-6544

OPEN TEXT
Intranet

Putting the Web to Work™

Compatible with Microsoft® Windows NT™.

Livelink, Open Text and "Putting the Web to Work" are trademarks of Open Text Corporation.
All other trademarks are the property of their respective owners.

Briefs

> **"Your videotape rental history has much better privacy protection than your Social Security number."**
>
> **– Lauren Weinstein, moderator of the electronic mailing list "The Privacy Forum"**

No federal law forbids disclosure of Social Security numbers. But a video-rental privacy law was enacted after Supreme Court nominee Robert Bork was embarrassed by the publication of a video list that included adult titles, Weinstein said.

Buyer beware: How to pick a 'net provider

By Bob Wallace

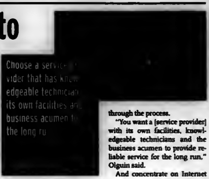
EVER HAD PROBLEMS with your Internet service provider?

"We opened a trouble ticket with them that stayed open for weeks. They sold more service than their network could handle," said Steven Thompson, a member of the network engineering group at Harris Corp. in Melbourne, Fla. "Their service people and management acknowledged that and said they'd upgrade their backbone network, but it never happened. You call them, and they don't call back. It's a comedy of errors."

That's what can happen to users who don't ask the right questions and end up choosing their business Internet service provider unwisely.

The service provider market has been typified by sweeping service problems, weak-kneed networks and rapid market consolidation, according to Sheryl Olguin, a project leader at Harris.

Choosing the right service provider is far from easy. The first step is to find the serious players among the start-ups and garage operations, according to users who have been through the process.



Choose a servic
vider that has kn
edgeable technician
its own facilities an
business acumen fo
the long ru

"You want a [service provider] with its own facilities, knowledgeable technicians and the business acumen to provide reliable service for the long run," Olguin said.

And concentrate on Internet service providers that sell primarily to businesses; stay away from those that offer unlimited access, advised Tom Nolle, president of CIMI Corp., a consul-

Picking a 'net provider, page 52

FIREWALL SECURITY

Screening for applets

▸ *Technology scans for rogue Java programs*

By Sharon Machlis

WHAT GOOD IS a firewall if users who are surfing the Web download potentially damaging executable code that runs on their systems without being screened — and sometimes without their knowledge?

That's the dilemma network administrators face as mini-applications — or applets — written in Java or ActiveX become more common on World Wide Web sites.

In an attempt to combat potential security problems from such unrestrained code, several major firewall vendors are using Java-screening technology from Israeli start-up Finjan, Inc. The company's U.S. office is in Santa Clara, Calif.

Finjan's SurfinGate doesn't screen for ActiveX applets but will include that ability in future versions, according to Lior Arussy, the company's vice president of marketing and sales.

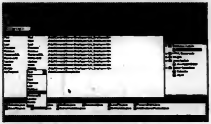
"It's difficult for us to assess the exact threat [from applets]," said Richard Perlotto, a corporate network security manager at VLSI Technology, Inc. in San Jose, Calif. "It's a large unknown quantity."

Perlotto said he would like to have Java-screening capability built in to CheckPoint Software Technologies Ltd.'s FireWall-1 software, which VLSI Technology uses.

Several major firewalls, such as FireWall-1 from Check Point Software Technologies, may incorporate Java applet screening

Bob Beecher, manager of development operations at Bell & Howell PSC Co. in Cleveland, said the product — since its early beta — has come a long way. "At this point, it works as adver-

Applets, page 52



SourceCraft's IntelliCraft makes it easier to build Java-enabled Web applications

SourceCraft Web tool combines Java, HTML

By Mitch Wagner

SOURCECRAFT, INC. today plans to ship IntelliCraft, a tool designed to make it easier to build Java-enabled World Wide Web applications.

"It's an extremely easy-to-use, industrial-strength product [with which] to develop Web sites," said Marcus Liuzzi, creative director at Crossroads Communications, an advertising agency in Nashua, N.H.

Liuzzi said he is impressed that the software lets a user build an online form using a drag-and-drop interface and then generate Java code automatically to control the form.

According to SourceCraft in Burlington, Mass., the software was designed to provide a unified tool set for building applications that combine Hypertext Markup Language (HTML) and standard Java. It was designed to build client/server applications that use the Internet as a communications mechanism — applications for customer service applications or catalog sales, for example.

Applications written in IntelliCraft can run on the Web or they can be distributed on CD-ROM. The software includes its own server, written in Java, on which the applications run. Because Java runs on many platforms, users can simply in-

SourceCraft, page 53

Picking a 'net provider

CONTINUED FROM PAGE 51

tancy in Voorhees, N.J.

Because profit margins for consumer access are thin at best, consumer-oriented service providers can't afford to invest in network expansions or upgrades to keep bandwidth high, and they can't afford to offer new services, Nolle said.

Users should consider the number of dial-in ports available and whether those ports are concentrated in places to which their employees travel, said Daniel Gasparro, a chief technologist at Booz Allen & Hamilton, Inc. in McLean, Va.

Analysts suggested that companies that would like to support mobile users look for service providers that offer toll-free telephone numbers.

The 800 numbers would give roaming users easier access to the Internet.

STRONG BACKBONE NEEDED

Failing that, some Internet service providers are installing huge banks of modems in heavily traveled cities to accommodate mobile workers who need dial-up Internet access, said Daniel Briere, president of TeleChoice, Inc., a consultancy in Verona, N.J.

Analysts said users with direct connections to their service providers also risk serious problems.

They suggested customers press prospective service providers about their network architecture; many providers sell users bigger pipes than the providers' backbones can handle.

Service providers "will tell you they're adding modems like crazy, but what isn't apparent is whether or not they're adding WAN capacity," said Jim Fey, director of strategic projects at Private Mortgage Insurance Co. in San Francisco. "One without the other isn't super useful."

Olguin said she prefers carrier/service providers such as AT&T Corp., MCI Communications Corp. and Sprint Corp. because they already have large global data networks and the deep pockets needed to continually expand the networks.

Olguin said she initially gave regular Internet service providers the advantage in the area of technology over carrier/service providers, but she said that's changing.

"AT&T and MCI had trouble understanding IP networking, but they've gotten much more knowledgeable, mainly by staffing up with people who understand Internet technologies," she said.

Applets may vex some firewalls

CONTINUED FROM PAGE 51

tised," he said. SurfinGate examines the content of Java applets in real time and creates a security profile that describes potential risks of the incoming program.

If the applet appears to violate policies the company has defined for using the security software, it will be filtered out. If it is allowed through, those same policies define which files, memory and network resources the applet may use.

This may delay the applet's execution, although company officials said performance degradation would be minimal.

Finjan announced it is working with CheckPoint Software in Redwood City, Calif.; Raptor Systems, Inc. in Waltham, Mass.; Milkyway Networks Corp. in Ottawa; Network-1 Software & Technology, Inc. in New York; and Trusted Information Systems, Inc. in Rockville, Md.

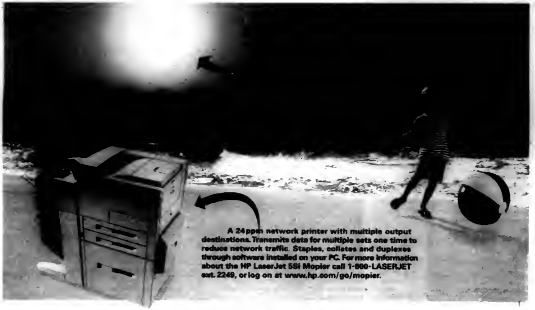
HACK ATTACKS

In demonstrations on various Web sites, rogue applets have crashed systems and searched users' machines for data to be sent to an outside server.

In Germany, hackers from the Chaos Computer Club demonstrated an Active-X applet that instructed bill-paying software to send money to the hacker's account, said Gene Spafford, a computer science professor at Purdue University and co-author of *Practical Unix and Internet Security*.

The issue of executable code on the Web that can be downloaded is greater than simply screening Java code, he said.

"Someone who's a determined hacker with a lot of resources who wants to be malicious probably will be able to get around anything [screening programs] can do," said Avi Rubin, a senior technical staff member at AT&T Bell Laboratories in Murray Hill, N.J. "There's no way the firewall can keep up with all the different encoding schemes."



A 24ppm network printer with multiple output destinations. Transmits data for multiple sets one time to reduce network traffic. Staples, collates and duplexes through software installed on your PC. For more information about the HP LaserJet 5Si Mopier call 1-800-LASERJET ext. 2249, or log on at www.hp.com/go/mopier.

Built by engineers.

HEWLETT PACKARD

'Most trusted man' has little faith in Web

And that's the way it isn't.

Walter Cronkite, once deemed the most trusted man in America, doesn't seem to be amused by the "anything goes" nature of publishing on the World Wide Web.

The former *CBS News* anchor conducted a Web search for his name and turned up a farce home page titled "Walter Cronkite Spit in My Food," which featured a fabricated story about an incident in a Disney World restaurant, complete with doctored photos.

The Dayton, Ohio, Internet applications developer who wrote the story said he intentionally made it ludicrous, disclaimed its truth and even described himself as a "crack-smoking devil worshiper who lives with his wife and 47 children in a cardboard box."

Even so, Cronkite considered suing the developer, according to an Associated Press report.

In place of the page now is the message, "Walter didn't get the joke, so the page is gone."

— Patrick Dryden

SourceCraft combines Java, HTML in one tool

CONTINUED FROM PAGE 51

clude the server in a CD-ROM distribution. This will allow users to access the application on the CD-ROM from any Java-enabled platform.

Most other tools for building Web-enabled applications cost more than the $995 IntelliCraft and often require run-time licenses for every copy deployed on the server, analysts said.

Ezra Gottheil, an analyst at Hurwitz Group, Inc., said the product is pioneering in its ability to combine a tool kit for building HTML and Java in a single box.

Competitors such as Microsoft Corp.'s Internet Studio and FrontPage and Haht Software, Inc.'s Hahtsite, don't do that, he said. "It looks pretty accessible and pretty powerful," Gottheil said.

The software can access data stored in a database by using Microsoft's standard Open Database Connectivity interface. The high-end version also supports the Java Database Connectivity interface from JavaSoft, Inc.

Users can build Web pages that have new information by using a notebook-like interface in IntelliCraft, or they can import material from existing Web sites.

The software can be set to check specific Web locations and download updates at designated intervals.

The low-end version of IntelliCraft ships today. It costs $995 per developer license; introductory pricing is $795. A 30-day trial version can be downloaded for free from www.sourcecraft.com.

The high-end version will ship March 17. It will cost $1,295 per developer license; introductory pricing will be $995. The high-end version will support proprietary Web interfaces for linking to Microsoft and Netscape Communications Corp servers. It also will support proprietary interfaces to databases from Oracle Corp., Sybase Inc. and Informix Corp.

NEW PRODUCTS

XENSE TECHNOLOGY, INC. has announced DB Publisher, which allows data query and information reporting from any relational database through an intranet or the World Wide Web.

According to the San Francisco firm, the product can be administered centrally. It includes a drag-and-drop interface.

DB Publisher costs $4,195 for each Windows NT server.

Xense Technology
(415) 495-6191
www.xense.com

TOLLFREE SOFTWARE SOLUTIONS has announced Truemail, electronic data transfer software for sending large files as electronic-mail attachments.

According to the Meadville, Pa., company, the product bypasses the Internet and uses a closed system. A user's 486- or Pentium-based PC serves as the host for the system, and only users designated as clients with software automatically generated by the host can get in. The host creates as many clients as needed.

The software also compresses and encrypts messages in the background.

Truemail costs $149.95.

Tollfree Software Solutions
(800) 362-7246
www.true-mail.com

Our new network printer
Prints, collates and staples multiple originals.

Used by normal people.

HEWLETT PACKARD

© 1996 Hewlett-Packard Company

NEC ANNOUNCES A RADICAL NEW CONCEPT
TO THE WORLD OF BUSINESS COMPUTING:

BUY NOW. SAVE LATER.

THE INTEL PENTIUM® PROCESSOR WITH MMX™ TECHNOLOGY. ANOTHER WAY NEC REDUCES TOTAL COST OF OWNERSHIP OVER TIME.

From the very moment you buy an NEC computer featuring a Pentium processor with MMX technology, you begin reaping the benefits.

Complex business applications will run 10% to 20% faster. Graphics and audio will be more powerful and realistic. And the performance of certain functions within applications written specifically for MMX technology will be increased by over 400%.*

But enhanced productivity is just one reason why you'll want to invest in MMX technology now. An even more compelling reason is to lower your total cost of ownership. By purchasing at the forefront of the technology curve, you'll not only maximize your return on investment, you'll minimize your cost of obsolescence.

AVAILABLE
NOW

That's because you'll be able to take advantage of emerging data-intensive technologies such as video conferencing, Internet and Intranet applications, sooner, and for a longer period of time.

However, NEC computers lower the total cost of ownership in other ways as well. Take Versa® notebooks, for instance. Not only is the NEC Versa 6050 one of the first to ship with a 150MHz Pentium processor with MMX technology, it's backward compatible with your current Versa 6000 Series options. And our UltraCare® Program helps minimize the cost of service and support. What's more, the Versa 6200 Series will feature the fastest mobile Pentium processor with MMX technology (166MHz) and the largest screen (13.3") available in a notebook.

AVAILABLE
NOW

In addition to the enhanced productivity benefits of MMX technology, NEC PowerMate™ desktop systems come standard with Intel's LANDesk® Client Manager and NEC MagicEye™ Technology. Which, by simplifying remote management and increasing fault prevention, lower the total cost of ownership in other ways. Namely, by reducing overall system downtime.

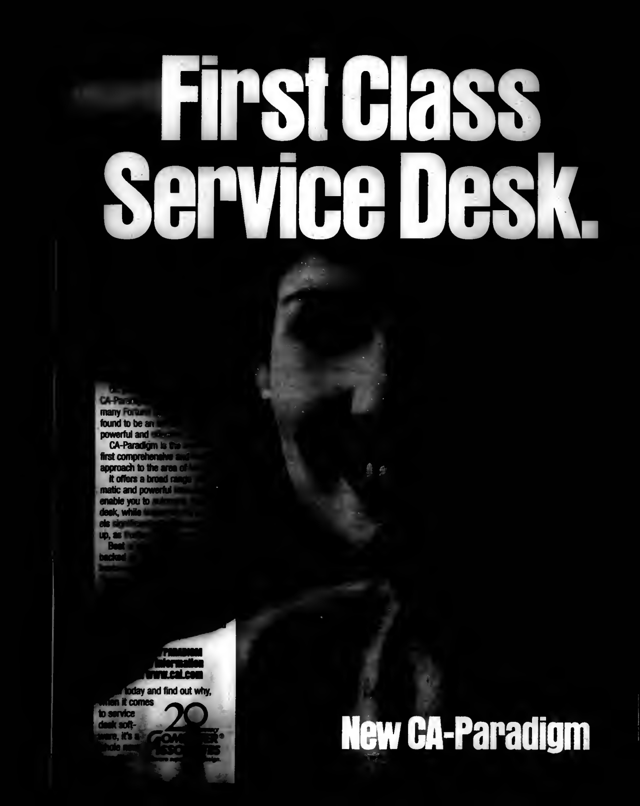
So look at it this way: The sooner you buy an NEC computer, the sooner you can start saving money. Now if that's not a radical concept, what is?

Call your authorized NEC reseller for immediate delivery. Or, for more information on how NEC computers can lower your total cost of ownership, call 1-888-306-4636 and reference "TCO."

SEE, HEAR AND FEEL THE DIFFERENCE.™

NEC

©1997 NEC Computer Systems Division, a division of Packard Bell NEC, Inc. UltraCare is a registered service mark, Versa is a US registered trademark, and PowerMate, MagicEye and See, Hear and Feel the Difference are trademarks of NEC Technologies, Inc. NEC is a registered trademark of NEC Corporation. All are used under license by Packard Bell NEC, Inc. The Intel Inside logo, Pentium and LANDesk are registered trademarks and MMX is a trademark of Intel Corporation. All other marks are property of their respective owners. Immediate delivery may not be available on all models. *Source: Image Processing component of Intel Media Benchmark for Windows®


First Class
Service Desk.
New CA-Paradigm

CA-Paradi
many Fortun
found to be an
powerful and
CA-Paradigm is the
first comprehensive and
approach to the area of
It offers a broad range
matic and powerful
enable you to
desk, while
els
up, as
Best
backed

PARADIGM
information
www.cai.com
today and find out why,
when it comes
to service
desk soft-
ware, it's a
whole new

20
COMPUTER®
ASSOCIATES

Corporate Strategies

Case Studies • Trends • Outsourcing

Finder and keeper

▸ *Merrill Lynch's Sorgen uses training, growth potential to retain staff*

By Thomas Hoffman

AS A 21-YEAR-OLD punch-card tabulator at Manufacturers Hanover Trust in 1959, Howard Sorgen was invited to take a programming aptitude test. Call it the first in a series of opportunities Sorgen seized and a lesson in the importance of giving information systems professionals room to grow.

CORPORATE STRATEGIST

Sorgen aced the test. And since his early programmer days, Sorgen has moved on to become senior vice president and chief technology officer at Merrill Lynch & Co., the world's largest brokerage.

In this role, Sorgen, 59, sees one of his main missions as making sure the company's 4,000 technologists get the kind of opportunities for advancement that will keep them from jumping to the competition.

Among Wall Street brokerages, Merrill Lynch has long held a reputation for recruiting the best and the brightest minds to the caverns of Lower Manhattan. Each year, the New York-based company interviews 700 candidates from the nation's elite IS schools — including MIT and the University of Michigan — to fill just 80 openings in its corporate technology internship program.

The first lesson for IS professionals: Learn your business. To infuse the 16-week training program with more of a business orientation, the interns began

Merrill Lynch, page 58

Briefs

Newark city surveyor helped implement GIS network

Newark GIS joins in battle against Old Man Winter

By Laura DiDio
NEWARK, N.J.

THE JANUARY '96 blizzard that dumped record snowfall on the Northeast was the inspiration for this city to install a state-of-the-art, graphics-based network to provide efficient snow removal.

Newark officials decided to implement the Geographic Information System (GIS) network when two-way radio transmissions and outdated maps proved no match for the avalanche of snow from last year's blizzard, said Marshall Cooper,

Newark, page 60

RISK-MANAGEMENT TOOLS

Systems deliver functionality but falter on integration

By Thomas Hoffman

BANKERS AND BROKERS use enterprise risk-management systems to calculate thousands of variables that can affect the price of a financial investment, such as a fixed-income investment or a security that pays a fixed rate of return until the underlying bond or stock matures.

But for all the bells and whistles these systems have, users will probably never find an all-inclusive system that integrates an organization's entire collection of data sets.

CLOSER LOOK

"There is no complete risk-management system that is turnkey, nor is there ever likely to be one," said Paul Mahady, president of Market Advisory Services, Inc., a Spring Lake, N.J., market advisory firm to banks and brokerages.

Most banks store customer information on mortgage loans, fixed-income assets and typically more than a dozen other financial instruments in stovepipe systems that cut across different geographic boundaries and are poorly integrated. As a result, banks and brokerages often have to do a lot of customization and systems integration work themselves to gather data into a central repository.

Analysts say these shortcomings aren't the fault of system vendors, but rather the result of how banks have modeled their data over the past 30 years.

"Disparate systems in banks were never designed to operate together as a homogeneous whole," said David Gilbert, president and chief operating officer at CATS Software, Inc., a Palo Alto, Calif., risk-management systems vendor.

An institutional investor, such as a soap manufacturer, might invest its money in fixed-income funds, equities and six other areas within the same bank. But because the bank uses separate systems to process all of those investments "it's a tremendous operational problem" for banks to map the customer's data sets together, said Larry Tabb, a technology analyst at The Tower Group, a financial services and technology consultancy in Newton, Mass.

Nevertheless, some tools ven-

Risk management, page 58

More than just the features

▸ *Business factors key to choosing tools*

By Patrick Dryden

FACTORS BEYOND technology come into play when large organizations are choosing whether to standardize on one product or platform.

A full suite can be "overkill," providing functions that won't be used.

For example, Xerox Corp. and Marriott International, Inc. were faced with similar business needs but went in opposite directions when each sought to consolidate a range of management tools to save time and money. Xerox and its outsourcer followed Computer Associates International, Inc. in Islandia, N.Y., while Marriott went with rival Tivoli Systems, Inc., a division of IBM in Austin, Texas.

"Eventually, we'll replace a whole potpourri of 10 or more nonintegrated, unipurpose tools," said Joe Grant, vice president of global technology, strategy and infrastructure at Xerox in Stamford, Conn. "We prefer effective management to expensive redundancy."

The same effort is under way at Marriott. Operators wound up with "at least 20 different ways to manage" after writing homegrown scripts and introducing new tools with individual projects, said Jim Rinaldi, vice president of information systems and technology at Marriott in Washington.

The CA and Tivoli products have the same technological goal, so companies deciding between them are weighing factors other than product features, according to users, consultants

Factors, page 58

Corporate Strategies

Case Studies • Trends • Outsourcing

Briefs

Unisys gets contract

Unisys Corp. in Blue Bell, Pa., has won a $14.9 million contract from the U.S. Social Security Administration. The five-year contract covers support and maintenance services for 452 Token Ring LANs, an Ethernet LAN, midrange servers and workstations. The deal follows the $280 million contract Unisys signed with the agency last year for installing LANs and workstations at 1,500 of the agency's offices.

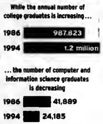
EDS to watch crops

Electronic Data Systems Corp. in Plano, Texas, has been awarded a five-year, $69 million contract by the U.S. Department of Agriculture to modernize the agency's computer systems and improve its monitoring of crop output and soil erosion from U.S. farmlands. EDS' tasks will include software engineering, imaging support, network operations support and application development.

Delta sells skills

Transquest, Inc., an Atlanta-based information technology subsidiary of Delta Air Lines, has created a research group to work on software for large-scale optimization of crew and schedule planning for other airlines. Transquest uses advanced scientific algorithms and linear programming techniques to optimize the use of crews and aircraft and to determine the most efficient routes.

LOSING TECHNOLOGY GRADUATES



Source: Department of Education, Washington

Finder and keeper

▸ *Merrill Lynch's Sorgen uses training, growth potential to retain staff*

By Thomas Hoffman

AS A 21-YEAR-OLD punch-card tabulator at Manufacturers Hanover Trust in 1959, Howard Sorgen was invited to take a programming aptitude test. Call it the first in a series of opportunities Sorgen seized and a lesson in the importance of giving information systems professionals room to grow.

CORPORATE STRATEGIST

Sorgen aced the test. And since his early programmer days, Sorgen has moved on to become senior vice president and chief technology officer at Merrill Lynch & Co., the world's largest brokerage

In this role, Sorgen, 59, sees one of his main missions as making sure the company's 4,000 technologists get the kind of opportunities for advancement that will keep them from jumping to the competition.

Among Wall Street brokerages, Merrill Lynch has long held a reputation for recruiting the best and the brightest minds to the caverns of Lower Manhattan. Each year, the New York-based company interviews 700 candidates from the nation's elite IS schools — including MIT and the University of Michigan — to fill just 80 openings in its corporate technology internship program.

Howard Sorgen

The first lesson for IS professionals: Learn your business. To infuse the 16-week training program with more of a business orientation, the interns began

Merrill Lynch, page 58

Donald Farkas

Newark city surveyor helped implement GIS network

Newark GIS joins in battle against Old Man Winter

By Laura DiDio

NEWARK, N.J.

THE JANUARY '96 blizzard that dumped record snowfall on the Northeast was the inspiration for this city to install a state-of-the-art, graphics-based network to provide efficient snow removal.

Newark officials decided to implement the Geographic Information System (GIS) network when two-way radio transmissions and outdated maps proved no match for the avalanche of snow from last year's blizzard, said Marshall Cooper,

Newark, page 60

RISK-MANAGEMENT TOOLS

Systems deliver functionality but falter on integration

By Thomas Hoffman

CLOSER LOOK

BANKERS AND BROKERS use enterprise risk-management systems to calculate thousands of variables that can affect the price of a financial investment, such as a fixed-income investment or a security that pays a fixed rate of return until the underlying bond or stock matures.

But for all the bells and whistles these systems have, users will probably never find an all-inclusive system that integrates an organization's entire collection of data sets.

"There is no complete risk-management system that is turnkey, nor is there ever likely to be one," said Paul Mahady, president of Market Advisory Services, Inc., a Spring Lake, N.J., market advisory firm to banks and brokerages.

Most banks store customer information on mortgage loans, fixed-income assets and typically more than a dozen other financial instruments in stovepipe systems that cut across different geographic boundaries and are poorly integrated. As a result, banks and brokerages often have to do a lot of customization and systems integration work themselves to gather data into a central repository.

Analysts say these shortcomings aren't the fault of system vendors, but rather the result of how banks have modeled their data over the past 30 years.

"Disparate systems in banks were never designed to operate together as a homogeneous whole," said David Gilbert, president and chief operating officer at CATS Software Inc., a Palo Alto, Calif., risk-management systems vendor.

An institutional investor, such as a soap manufacturer, might invest its money in fixed-income funds, equities and six other areas within the same bank. But because the bank uses separate systems to process all of those investments "it's a tremendous operational problem" for banks to map the customer's data sets together, said Larry Tabb, a technology analyst at The Tower Group, a financial services and technology consultancy in Newton, Mass.

Nevertheless, some tools ven-

Risk management, page 58

More than just the features

▸ *Business factors key to choosing tools*

By Patrick Dryden

FACTORS BEYOND technology come into play when large organizations are choosing whether to standardize on one product or platform.

Jim Rinaldi:

A full suite can be "overkill," providing functions that won't be used.

For example, Xerox Corp. and Marriott International, Inc. were faced with similar business needs but went in opposite directions when each sought to consolidate a range of management tools to save time and money. Xerox and its outsourcer followed Computer Associates International, Inc. in Islandia, N.Y., while Marriott went with rival Tivoli Systems, Inc., a division of IBM in Austin, Texas.

"Eventually, we'll replace a whole potpourri of 10 or more nonintegrated, unipurpose tools," said Joe Grant, vice president of global technology, strategy and infrastructure at Xerox in Stamford, Conn. "We prefer effective management to expensive redundancy."

The same effort is under way at Marriott. Operators wound up with "at least 20 different ways to manage" after writing homegrown scripts and introducing new tools with individual projects, said Jim Rinaldi, vice president of information systems and technology at Marriott in Washington.

The CA and Tivoli products have the same technological goal, so companies deciding between them are weighing factors other than product features, according to users, consultants

Factors, page 58

Risk management

CONTINUED FROM PAGE 57

dors address the integration issue, including Algorithmics, Inc. in Toronto and Infinity Financial Technology, Inc. in Mountain View, Calif.

Risk Management Technologies (RMT) in Berkeley, Calif., for example, offers Genesis, a data-mapping package designed to pool customer account information from a variety of sources into a central repository. Data is then fed into RMT's Radar Risk-Manager system to analyze positions and run simulations based on different interest-rate environments and market scenarios. That enables traders or risk managers to forecast performance and profitability trends.

Great Western Financial Corp., a Chatsworth, Calif.-based thrift that has been a Radar shop since 1993, began to use RMT's Genesis software last September to gather all of its disparate customer data.

Although Genesis has performed "reasonably well," Great Western would like to see additional improvements in data gathering, said Willie Wolfe, a first vice president of asset liability management. "That's where there's room for improvement," he said.

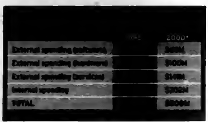
Quantum leaps in Unix hardware processing speeds have also made it possible for these risk-management systems to run faster than ever. For example, in the middle of last year, PNC Bank in Pittsburgh began to replace its PC-based risk management system from Sendero Corp. in Scottsdale, Ariz., with RMT's Radar system.

With the Sendero system, it takes the bank 20 minutes to run an interest income and expense model for 300 financial instruments. Using Radar, PNC can generate 200,000 cash-flow instruments in the same amount of time, said John Kubiak, vice president of risk management at the bank. Kubiak said the bank, which has $70 billion in assets, expects to go live with Radar by the second quarter.

Since it installed Radar in 1993, Chase Manhattan Mortgage Co. has received measurable benefits, such as filtering capabilities that allow Chase's risk managers to look at a specific set of mortgage loans "without having to alter the entire setup," said Tom Stenger, a portfolio manager at the Edison, N.J., company.

But Stenger said he would like to see RMT integrate Radar better with Chase's own mortgage loan prepayment models. "That's becoming the single biggest wish-list item for risk managers," Stenger said.

In loan portfolio management, "we're probably doing more sophisticated stuff than anybody in the industry," said Stenger, who placed Chase's hardware, software and testing costs at just under $1 million over the past three years.



	[illegible]	2000*
External spending (software)		[illegible]
External spending (hardware)		$100M
External spending (services)		$140M
Internal spending		[illegible]
TOTAL		[illegible]

Source: The Tower Group, Newton, Mass.

Merrill Lynch

CONTINUED FROM PAGE 57

taking the Series Seven exam three years ago to become accredited stock traders. That "helps them understand the business from the get-go," said the raspy-voiced Sorgen.

But once Sorgen and his team get new technology talent on board, they find that Merrill Lynch's recruiting and training success can be a double-edged sword. Soon enough, the competition comes calling.

To help Merrill Lynch fend off rapacious rivals, Sorgen helped introduce a special achievement program 10 years ago that rewards technologists for their efforts on a quarterly basis. Depending on individual achievement, the bonuses can range from $3,000 to $10,000, Sorgen said.

"We try to pay for performances overall and for the quick-hit process" that has an immediate impact on profit or revenue, Sorgen said. "We don't want people to get stale in any initiative or any business. We want people to feel like they can grow within Merrill Lynch."

> "We don't want people to get stale in any initiative or any business. We want people to feel like they can grow within Merrill Lynch."
>
> – Howard Sorgen

Observers suggest that these efforts have paid off. "The quality of the people at Merrill is very strong," said Gus Oakes, president of Executive Directions, Inc., a New York-based search firm for information technology professionals that does much of its recruiting on Wall Street.

PAYS TO STAY

Opportunities have kept Maria Ciunga at Merrill Lynch. Ciunga, who went through the company's internship program in 1993, became project manager of the mortgage trading systems team three years after joining the company.

She is now assistant vice president of marketing applications at the company's London trading area, and she said she has declined several lucrative job offers from outside. "As money goes, it might not have been the best deal for me to stay put, but it's not like I haven't been rewarded," Ciunga said. "I continue to have more responsibilities put on me, and I'm constantly challenged."

Factors to consider go beyond features

CONTINUED FROM PAGE 57

and industry analysts involved in the decisions.

One key differentiator is each vendor's approach to integration. CA's Unicenter offers a full suite to tackle a long list of tasks. The Tivoli Management Environment (TME) offers a framework to support "best of breed" selection of tools, which can be implemented at a user's own pace.

"It's a philosophy issue — do you want your management all at once or step by step?" said Paul Mason, an analyst at International Data Corp. in Framingham, Mass.

A full suite is overkill because it provides more functions than the staff could initially deploy and use, Rinaldi said.

Marriott had started with fundamental management of more than 400 systems and then adopted TME to support software distribution. Other functions will follow later, Rinaldi said, as the company plugs in additional tools from Tivoli and other vendors.

DODGING A SHOWDOWN

Xerox, on the other hand, wanted to avoid "a religious debate" over which platform to use, especially when the outcome would just "depend on judgment calls," Grant said. So the company outlined its needs to Electronic Data Systems Corp. and let the outsourcer decide the best way to deliver all the required functions as soon as possible.

As a result, EDS operators already are starting to manage 1,700 Xerox servers and distribute software using Unicenter and will soon implement the suite's ability to diagnose distributed clients and LANs and to monitor vital business processes, Grant said.

The pace of implementation isn't the only question, however. Past loyalties also affect current adoptions, said Greg Cline, a director at Business Research Group in Newton, Mass.

"Old ties die hard, so if CA or IBM is entrenched in a site, then IS is more open to that vendor's management offering," Cline said.

History can work against a vendor that pitches new tool kits, however.

For example, many sources disparaged CA for past practices such as poor support and hardball sales tactics that one CA executive described as "upgrades by litigation."

But CA is working to polish its tarnished image, said analysts and CA officials.

Other users criticized IBM for ancient wrongs or regarded Tivoli as too immature despite its acquisition by IBM.

Both CA and Tivoli offer strong technology, Cline said, so "the choice comes down to your style of integration, past loyalty and belief in each vendor's future direction."

SHORTS

IBM, Trusted ink deal

IBM has acquired the right to use RecoverKey encryption technology from Trusted Information Systems, Inc. in Glenwood, Md., as part of IBM's new SecureWay Key Management Framework. SecureWay was designed to help various key-management and recovery techniques work together.

Software churns orders

Land O' Lakes, Inc., a food and agricultural cooperative in Arden Hills, Minn., has signed a $1.2 million software contract with Industri-Matematik International Corp. in Tarrytown, N.Y. for its System ESS demand chain management system. Land O' Lakes plans to run the software on a Hewlett-Packard Co. HP 9000 to manage its order-fulfillment and accounts-receivable settlement processes.

Telecommuting on the rise?

The San Francisco Bay Area is likely to lead the nation in the growth of telecommuting, according to a Bay Area Council report. About 900,000 of the area's 3 million workers perform at least some work from home, and that number is increasing by 10% to 15% annually, the study said.

How healthy is your software? To find out, get our free Software Health Check.

In today's networked world, the health of your business relies on software. Yet how can you be sure the choices you make today will be right for your changing needs? Call 1 800 627-2938, code ZXP6D005 or stop by www.software.ibm.com/is/enterprise/ for a free customized report prepared by RONIN Corporation, a worldwide IT research and consulting firm. Based on your input, it will show how your current environment compares with your industry's best practices and where to concentrate your efforts. So you can keep your business operating at peak condition. Now, we promise, this won't hurt a bit...

The IBM home page is located at www.ibm.com. IBM is a registered trademark and Solutions for a small planet is a trademark of International Business Machines Corporation. © 1997 IBM Corp. All rights reserved.

Solutions for a small planet™ IBM

Newark GIS ready to battle next blizzard

CONTINUED FROM PAGE 57

Newark's director of neighborhood services.

The GIS project is based on Windows NT and Unix systems. It includes a specialized Geographics computer-aided design package from Bentley Corp. in Exton, Pa., according to Robert Higgenbottom, a technical consultant for the city of Newark.

The network itself is small — six systems that run Windows NT Workstation attached to an NT Server. But more than 100 city workers and executives have access to the data.

The network provides Newark, whose population of 280,000 swells to 1 million during the working day, with a three-dimensional digital map of the city's 26 square miles and 900 streets.

For Newark's GIS network, the workstation has a colorful display, much like a video game. With images from low-altitude aerial photography, city engineers and network managers "have been able to input a sophisticated map that details every geographic landmark. That includes the height of the curbs, all buildings, trees and fire hydrants," said Donald Farkas, the city surveyor who helped implement the GIS network.

"The engineers can then print out the 3-D graphics of the streets and roads and also transmit that information to the sanitation, police and fire departments so that they can quickly be deployed to troublespots and areas hardest hit during a storm," Cooper said.

COST CUTTER

Newark's GIS network will save in labor and management costs associated with snow removal, salting and road repairs, city officials said.

Eventually, the GIS network will be expanded to manage all aspects of Newark city government and resources, ranging from more efficient census and mapping capabilities for property taxes to police and traffic-code enforcement.

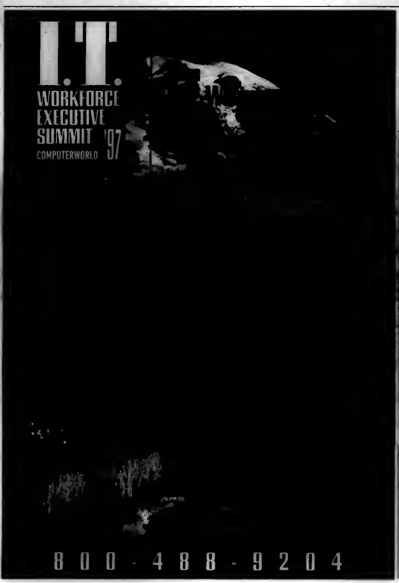
Ironically, now that the GIS network is in place, Newark has had very little snow this winter. But the city has performed several practice runs to familiarize workers with how GIS works.

There is no doubt in Anthony Lukowiak's mind that the GIS network would have made snow removal and salting operations much more efficient last winter. As acting manager of Newark's Sanitation Department, Lukowiak was in charge of all day-to-day snow removal.

When supervisors comb Newark, the system lets them dispatch information about primary and secondary streets and the status of the roads that surround hospitals and schools — areas that will then be entered into the GIS network's War Room at Sanitation headquarters. Managers can project a city map onto a screen on the office wall. And snowplow drivers can call the dispatch office on their radios to inform supervisors which streets have been plowed and update them on road conditions.

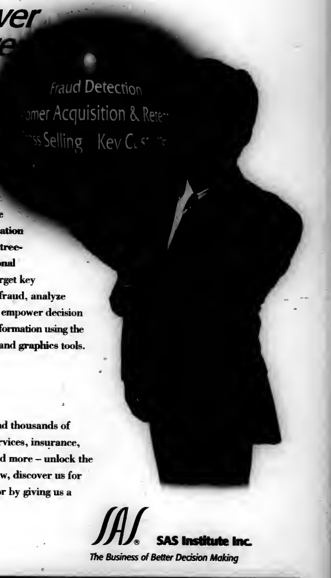
GIS also will let Newark Sanitation supervisors provide drivers with specific routes to plow, "whereas before it wasn't organized, and we wasted a lot of time on needless travel," Lukowiak said.

Lukowiak estimates that the GIS network could save as much as two to four hours per day for each snowplow and salt truck. "Since each truck costs $150 per hour, plus $50 per supervisor, we could save thousands or even tens of thousands of dollars, depending on the severity and length of each storm," Lukowiak said.



The SAS® Data Mining Solution

The Power to Pre



With SAS software's integrated data mining and decision support tools, you can uncover all the business "secrets" locked away in your massive databases *hidden patterns* **that can make your business more profitable, more competitive and more responsive to customer needs.**

Exploit your data by exploring it with the richest variety of data analysis and visualization techniques. Use OLAP, neural networks, tree-based models, churn analysis, and traditional statistics to improve customer retention, target key prospects, profile market segments, detect fraud, analyze response rates, and much more. And then empower decision makers to exploit and share this newfound information using the most sophisticated forecasting, reporting, and graphics tools.

Visit Us on the Web... and Look into the Future of Data Discovery

SAS software is helping the Fortune 100 and thousands of other companies – in banking, financial services, insurance, health care, retail, telecommunications, and more – unlock the full potential of their data warehouses. Now, discover us for yourself at www.sas.com/datamining/ or by giving us a call at 919.677.8200.

SAS® SAS Institute Inc.
The Business of Better Decision Making

Phone 919.677.8200 Fax 919.677.4444 In Canada 1.800.363.8397 E-mail cw@sas.com

SAS is a registered trademark of SAS Institute Inc. Copyright ©1997 by SAS Institute Inc.

Plan new career heights with CareerAgent.com

[illegible] careeragent.computerworld.com

[illegible] the pre[illegible] [illegible] through co[illegible] [illegible] group [illegible] [illegible] training stan[illegible]

[illegible] team has [illegible] corporate goals. Think about [illegible] benefit from [illegible] information connected to cou[illegible] [illegible] where management and staff [illegible] [illegible] On the Internet or [illegible]

[illegible] **careeragent.computerworld.com** or call 1-800-[illegible] [illegible] your team what it should be a well-planned [illegible]

Search Thousands of Course Listings From:

Learning Tree International
Wave Technologies
Hewlett-Packard Educational Services
Boston University Corporate Education Center
Interpersonal Technology Group
DPEC
Business Communication Review
American Research Group (ARG)
HBM Technology Group
HOTT (Hands on Technology Transfer)
NIIT, Incorporated
The Center for Systems Management
New Horizons
Sybase/Powersoft Education
And more coming soon...

ALL YOU NEED IS INTERNET ACCESS · FREE SEARCHING

New From:
COMPUTERWORLD

CAREER AGENT™
careeragent.COMPUTERWORLD·com

Computerworld is proud to announce the winners of the

1997 Resellers' Choice Award

The first annual Computerworld Reseller Choice Awards are based on a survey of Computerworld's extensive database of nearly 7,000 North american business-to-business resellers, including Value-Added Resellers (VARs), System Integrators and Network Integrators. The survey determined which computer system, software and network solutions – in eighteen key categories – are sold by the most VARs.

Category	Award Winner
Workstation, Mid-Range, Small Multi-User	IBM
Personal Computer	Compaq
Office Suite software	Microsoft
Bridges	3Com
Routers	3Com
Hubs	3Com
Servers	Compaq
Remote Access	3Com
Laser Printer	Hewlett Packard
Ink Jet Printer	Hewlett Packard
Dot Matrix Printer	Okidata
Disk Drive	Seagate
Tape Drive	Colorado (HP)
CD-ROM Drive	NEC
Optical Drive	Hewlett Packard
RAID	Hewlett Packard
Modems	U.S. Robotics
Uninterruptable Power Supply	American Power Conversion

COMPUTERWORLD
The Newsweekly for Information Technology Leaders

[illegible]
Computerworld [illegible]
Awards Program Conta[illegible]

John Carpenter
Vice President
Computerworld
Information Management Group
(800) 34[illegible]
john[illegible]

COMPUTERWORLD
Resellers'
CHOICE

Harness the Power of your Distributed Environment

PATROL

The true potential of your distributed environment is right there, waiting to be harnessed. The PATROL® Management Suite gives you the power. PATROL proactively monitors a wide range of availability and performance indicators for all of your leading applications, databases, middleware and underlying resources, helping you to ensure your critical applications and data are available - 24 hours a day, 365 days a year.

PATROL management support is available today for more than 40 leading software solutions, including Oracle, Oracle Financials, SAP R/3, TUXEDO, Lotus Notes, Internet servers and your in-house applications. Scaling efficiently across thousands of servers running Unix, Windows NT, OS/2 or MVS. And integrating seamlessly with your existing management frameworks, including HP OpenView, *IBM's Tivoli TME, and Cabletron SPECTRUM.

No wonder so many Global 5000 firms and government organizations depend on PATROL to harness the true potential of their distributed systems.

BMC® SOFTWARE

For more information, CALL
800 841-2031 or 713 918-8800
or visit us on the Web at:
www.bmc.com/patrol

Harness the Power-Today!

BMC Software, the BMC Software logos and all other product or service names are trademarks or registered trademarks of BMC Software, Inc. in the USA and in other select countries. ® and ™ indicate USA registration or USA trademark. *IBM and Oracle are trademarks or registered trademarks of respectively. International Business Machines Corp. and Oracle Corp. Other logos and product/trade names mentioned are registered trademarks or trademarks of their respective companies. © 1996-'97 BMC Software, Inc. All rights reserved.

SPECIAL REPORT

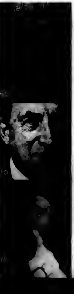
SECURITY

A graduate student takes only three and a half hours to break the most secure encryption code that can be legally exported.

A fired employee encrypts the company's vital databases on his way out the door.

It's no wonder security keeps information systems managers up at night. In a recent Computer Security Institute survey, 42% of respondents said they've experienced an intrusion or some unauthorized use of their systems in the past year. And those were the shops that would acknowledge a problem; security breaches are notoriously underreported.

Data theft from the inside, hacks from the outside, viruses, encryption — they all fall under the security umbrella, and they all fall to you. With the breadth of the field in mind, this Special Report on security examines the issue from several angles:



66 Senior editor Robert L. Scheier observed firsthand a comprehensive security review. He learned that all the technology in the world won't help you if strangers roam unchecked at your site.

70 Columnist Paul Strassmann, fresh from conducting a study for the U.S. secretary of defense on how to protect the nation's defense information infrastructure, explains how to protect your company's information assets.

73 Product review: We test tools that guard against groupware-borne viruses.

79 Vendors eagerly tout their servers' security bells and whistles, then disable them before shipping.

And that's not all. We also look at some of the career paths in this fast-growing field.

COMPUTERWORLD

For even more, visit our Web site: www.computerworld.com. Editor Paul Gillin and Executive Editor Maryfran Johnson this week will conduct an audio debate on the role of security — or lack of it — in Internet-based commerce.

Exposing Risks

Do you think security means high-end routers? Packet filters? Before doing all that . . .

LOCK the DAMNED DOOR!

JOHN COLETTI

Robert L. Scheier

The hospital security chief was mighty proud of the metal detector in the emergency room. It screens for weapons so gang members can't barge in to the treatment area to finish off the victim of a stabbing or shooting.

There's just one problem. Anyone can bypass the metal detector by taking a series of elevators and hallways to an unguarded rear door of the emergency room. The most high-tech security precautions have been blindsided by a simple, obvious oversight.

Information systems professionals often make the same mistake by spending too much time fighting sophisticated electronic threats while ignoring basic problems such as unlocked doors or muddled procedures. Lax physical security and carelessness by your staff can pose as great a threat to corporate data as a hacker who works for your competition.

That became painfully clear recently when

Stats & stuff

HOTTEST AREAS OF INFILTRATION

- Theft of client information
- Theft of trade secrets
- Theft of new-product plans
- Theft of product descriptions

Source: Computer Security Institute

Cybercrime timeline

1970

1970 John Draper (Captain Crunch) fakes long-distance call tones with a whistle from a cereal box. He is arrested repeatedly throughout the 1970s for phone tampering. He's sent to jail three times.

1971

1971 Disgruntled employees of Honeywell Corp. sabotage the Metropolitan Life Insurance Co. computer network and render it inoperable for a month.

1973

1973 Executives at Equity Funding Corp. of America use computers to create $2 billion in counterfeit insurance policies and assets.

Computerworld accompanied a team of security experts as they reviewed security practices at a hospital in the Southwest, which will remain unnamed for obvious reasons.

The good news: The hospital is well-protected against electronic attack from the outside. But the bigger threat to information security, the review found, is from sloppy procedures for information handling and from physical access to such things as power supplies, modems and network cables.

The review was an abbreviated version of the Net'Vestigator security reviews offered by the Network Systems Group of Storage Technology Corp. in Minneapolis. Those reviews, conducted by three of Network Systems' business partners, are conducted to reveal a client's "information vulnerabilities."

One partner, The Guidry Group, a security consulting firm in The Woodlands, Texas, focuses on physical threats to information. Those range from doors that aren't locked to fire alarm systems that don't work. Guidry consultants might sift through trash bins for unshredded documents or peer through windows to see what they can read on users' computer screens. At this health care facility, Guidry consultants found physical security to be unusually bad.

Meanwhile, WheelGroup Corp., a San Antonio security software and services company, analyzes the client's vulnerability to electronic attack from internal or external hackers. WheelGroup consultants use automated "war dialing" software to dial blocks of numbers at the client site until a modem answers. They then try to link to the host system via common remote-access software. They also scan IP addresses reserved in the client's name to learn which operating systems and network services run on those addresses. Armed with that information, the consultants can try to exploit known weaknesses in those systems.

The health care facility scored best in this area. Its centrally controlled infrastructure of Novell, Inc. NetWare LANs, mainframes and dumb terminals and its lack of Internet connections left it relatively safe from external attack. WheelGroup found a few potential weak spots, but in most cases the hospital's network administrator already knew of them or had plans to fix them.

Finally, Minneapolis law firm Oppenheimer Wolff & Donnelly evaluates the client's policies, procedures and possible liabilities. Attorney M. Peter Adler grills a string of officials about who is supposed to handle different security jobs. Again, the facility did poorly, with various IS and business managers giving confusing or vague answers.

With little accountability or emphasis on security, it's no wonder that the investigators found that it would be no problem to stroll into server rooms without being challenged, walk away with sensitive patient information and telephone numbers to incoming modem lines, cut power to large sections of the hospital and disable hundreds of network nodes by entering unlocked utility rooms.

Think this couldn't happen to you? Read on and ask yourself how your company would stand up to such a review. Then check out the story on page 68 to see how well the hospital fared in the areas of electronic safeguards as well as policies and procedures meant to keep people on their toes.

THE PAPER TRAIL

Guidry's director of investigations, Chuck Powers, and security consultant Gary Calkins play the role of invaders. Several IS and security officials know who the two men are, but none of the other hospital employees or its IS staff are aware the review is taking place. For all anyone knows, Powers and Calkins could be scam artists off the street, disgruntled employees or lawyers for an unhappy patient. But they're wearing suits, which seems to shield them from questions.

Strolling into an empty and unlocked lounge, Powers finds a dumb terminal linked to the hospital's patient-record system. The terminal is off-line, and Powers lacks the password to log on. But who needs passwords when there's a pile of patient files and X-rays sitting on a nearby desk?

The files contain a wealth of personal information that could be embarrassing to patients and a gold mine to a criminal. They include patients' names, addresses, home and work phone numbers and Social Security numbers, plus intimate details of the patients' symptoms and treatments. Powers and Calkins casually sit down and begin copying information from the records, one of which is for a patient who was discharged two weeks earlier. In another lounge, an unattended printer spits out orders that identify which patients are receiving which treatments.

"It's foolish to have security passwords and cryptographic information on the computer if that same information is printed on paper lying in unlocked offices," says Donn Parker, senior management systems consultant at SRI Consulting, a security consulting firm in Menlo Park, Calif.

Leaving such records out in the open is not only a breach of patient confidentiality, but it also could open the door to civil or criminal action, Adler says.

WHO'S MINDING THE FUSE BOX?

"Want to take down the network?" the network administrator grins mischievously, pointing to a row of white coaxial cables on the wall of a utility room. Ripping out those wires, he says, would disable most of the terminals that provide patient information in the emergency room. Farther down the wall is a line of unlocked electrical boxes full of circuit breakers that control power to various parts of the hospital.

Who needs passwords when there's a pile of patient files — with potentially embarrassing personal information — and X-rays sitting on a nearby desk?

JOHN COLETTI

Lock the door, page 68

Only **16.9%** of respondents who experienced computer intrusions in 1995 reported them to law enforcement

Source: Computer Security Institute's 1996 CSI/FBI Computer Crime and Security Survey.

HAS YOUR COMPANY EXPERIENCED UNAUTHORIZED USE OF ITS COMPUTER SYSTEMS IN THE PAST 12 MONTHS?

21% Don't know
37% No
42% Yes

Source: Computer Security Institute's 1996 CSI/FBI Computer Crime and Security Survey

1980 1981 1982

1980 The first recorded worm takes control of the experimental Ethernet at Xerox Parc.

1981 Kevin Mitnick, 17, is convicted and placed on parole for stealing computer manuals from a Pacific Bell switching station.

1982 Kevin Mitnick gains national notoriety for breaking in to the North American Air Defense Command computer. He also seizes temporary control of three phone company central offices in Manhattan and gains access to all the phone switching centers in California. He reprograms someone's home phone so that each time the receiver is picked up, a recording asks for a coin deposit.

Lock the door

CONTINUED FROM PAGE 67

The network administrator calls two staff electricians to decipher the faded labels on the circuit breakers. Neither can say which parts of the hospital the circuits control. With Powers and Calkins watching, a maintenance man sheepishly locks the door but doesn't check it. Two minutes later, a man carrying a ladder walks up and opens the door with a hard tug.

Even when the network administrator knows he has a yawning security gap, he can't fix it. One wiring hub, consisting of a thick cluster of 10Base-T wiring, Ethernet hubs and patch panels, sits in a corner of a storage and copier room. Why doesn't he put up a wall around the wiring to protect it from sabotage? Because the hospital's communications department "threw a hissy fit" before letting him put the equipment in its room, he laughs, and a wall would also need the department's approval.

JOHN COLETTI

ALL IT TAKES IS CHUTZPAH

Powers gets into the locked data center by simply pushing the buzzer. Walking in, he casually tells the one IS staffer in sight, "We're just here to take a look at your systems." Rather than challenging the intruders, the staffer cheerfully nods and goes back to work, leaving Powers and Calkins to wander among servers, routers, terminals and tape backups. They could just as easily be rebooting servers or stealing backup tapes. Powers, using the same technique, later breezes into the central medical records unit and waves a thank-you to the receptionist as he walks out with a patient's file.

"There's no [management] emphasis on security, and therefore there's no awareness of security" on the part of employees, Adler says. Other companies have done everything from giving bonuses to employees who challenge interlopers to the less costly route of simply putting up posters about the need for security. "Until the company can get top-down policy and processes," he says, "they're going to continue to have these types of lapses."

Scheier is Computerworld*'s senior editor, management.*

A MIXED DIAGNOSIS

Here's how the hospital fared in the Network Systems Group's review

ELECTRONIC SECURITY

The hospital did fairly well, says Scott Waddell, director of technical operations at WheelGroup. Its centrally controlled infrastructure of NetWare LANs, mainframes and dumb terminals is relatively secure because it isn't linked to the Internet. Its Unix servers are only interfaces between internal applications and the mainframe, and they don't run vulnerable services such as Hypertext Transport Protocol and file transfer protocol.

Waddell was able to scan the facility's IP addresses to get a list of operating systems and network services. Other WheelGroup reviewers were able to access the hard drive of a network monitoring workstation and get information about the configuration of the hospital's network. But those intrusions would just tell a hacker where to attack next rather than give him actual access to applications or data.

Bottom line: "Without a [network] account and a password, you're pretty severely limited as to what you can get access to," Waddell says.

POLICIES AND PROCEDURES

Much worse than average, the reviewers say. When asked who's in charge of data security, the network administrator says it's probably him, "but I'm not so sure I have the knowledge" to do the job. The security chief says he too thinks data security is his job but acknowledges he focuses on physical security.

For years, the network administrator has tried to control which users get modems and phone lines to reduce the risk of hackers dialing in and attacking the network. But influential doctors and administrators skirt the guidelines, he says, resulting in at least 75 unauthorized modems on site. The communications department doesn't even tell him when it installs phone lines for the modems.

PHYSICAL SECURITY

Much worse than average, the reviewers say. The threats extend far beyond those to information (see main story.) Despite a network of security cameras that monitor hallways, the reviewers could walk unchallenged into supply rooms filled with drugs and syringes and could wander around patient care areas unimpeded, even late at night. — Robert L. Scheier

There are around **10,000** known viruses. Of those, **200 to 220** currently pose a threat, according to Jonathan Wheat, antivirus lab manager at the National Computer Security Association in Carlisle, Pa.

The No. 1 security incident that affects respondents' sites is viruses and malicious code, according to Datapro Information Services' 1996 International Survey on Information Security.

1983

1983 **"We were just playing a game," says Neil Patrick, who was convicted of computer trespassing, along with six other Milwaukee teens. Among the alleged break-ins: The New York Memorial-Sloan Kettering Cancer Center, Security Pacific National Bank and Los Alamos National Laboratory.**

1985

1985 **A yearlong investigation uncovers a ring of 30 University of Southern California students who changed grades, created fraudulent degrees and even sold doctoral degrees for up to $25,000.**

UNIV. OF S. CALIF.

nature, perfect replication is extremely rare.
In business today, it's essential.

Announcing Vision Suite, the first software designed to replicate your AS/400 data to multiple sites in real time. With Vision Suite, you have instantaneous information available wherever you need it, for up-to-the-second data and high systems availability. You can also use it for workload balancing and unlimited horizontal growth, linking up to 10,000 sites. In fact, Vision Suite has already been up and running at complex sites in Fortune 500 companies around the globe. Most important, it's from the world leader in data replication and propagation, an IBM premier business partner. To learn more about how perfect replication can help your business, call Philip Marlowe at (800) 683-4667 or e-mail at info@visionsolutions.com.

©1997 Vision Solutions, Inc. Vision Suite is a trademark of Vision Solutions, Inc. All other trademarks are the properties of their respective owners.

PAUL STRASSMANN

WHAT'S THE BEST IS DEFENSE? BEING PREPARED

It's time for information executives to turn fearful. CIOs must become as aggressive about information security as the professional spies and thieves who threaten them.

Professional thieves and blackmailers, not amateur or prankster hackers, traverse the global network seeking opportunities to steal money, launder illegal funds or extort political concessions. They have an exceptionally high level of technological sophistication.

Information warfare is raging on the economic front. Governments and businesses seek an advantage over rivals through cybercrime and electronic espionage. Their targets: information assets such as engineering drawings, process flowcharts, experimental data, software, patent applications, test results, financial data, customer prospect lists, business proposals and litigation documents.

How will your company's computers fare when they come under attack? And if you are the CIO, how will you fare? Like it or not, chief information officers are also chief information security officers. You must answer for the fragility of your company's information systems.

Here's what CIOs need to do:

1. TAKE CHARGE OF SECURITY

CIOs must accept the security, integrity and availability of their companies' computer networks as one of their key responsibilities. That responsibility can't be outsourced.

The office of the CIO must have the charter to collect, analyze and understand incidents whenever it detects information-security infractions, regardless of where they occur. The CIO must have the means to monitor compliance with information-assurance policies. The board of directors, and specifically the board's audit committee, should look to the CIO to certify that information-security exposures don't exceed specified expectations.

CIOs also must direct their development staff to make information security an inherent element of IS design. Retrofitting security into a system designed on the presumption of innocence and honesty is often too expensive — or too late — to be worth doing.

2. CREATE INDEPENDENT CENTRAL SECURITY STAFFS

Large companies need a knowledgeable and trusted staff of experts who can analyze threats to their business and install countermeasures against information attacks. That includes attacks that ask for help from trusted insiders, such as employees and contractors. The staff should oversee the following:

- INFORMATION-SECURITY ASSURANCE: Informing top managers about the quality, robustness and reliability of existing information-security capabilities.
- SECURITY COORDINATION: Making sure the functions that influence information security perform as an integrated process, not as separate tasks.
- INCIDENT EVALUATION: Evaluating and accounting for every case in which information security is compromised or suspected of being compromised.

The security staff must have the authority to review all information-handling practices and procedures to ensure that systems are secure.

Companies also need an independent technical review organization to certify their information-security design practices. Without independent certification, the danger frequently is that those who cause information-security exposures won't recognize that they have done so.

3. PROTECT THE SECURITY BUDGET

CIOs must champion investing a significant share of IS resources in security.

Companies are kept from taking security seriously by organizational indifference to strict security precautions; competing interests, such as quickly filling technical positions without thoroughly checking the personal backgrounds of candidates; and disincentives to security cooperation, such as making information easily available to everyone. Security funding becomes a tempting target for executives seeking money for pet projects.

Security funding faces two problems: Information security is expensive, and the payback isn't apparent until it's too late. One security-minded company budgeted $310 per person to cover the cost of security: secure ID cards, antivirus software, an Internet firewall server, secure ID numbers for employees in transit, encryption software, intrusion detection systems, central security administration and a security-testing staff. Add the cost of delays and inconveniences caused by security practices, and the cost balloons to $1,000 per person per year — as much as 10% to 15% of workstation expenses.

One solution is to eliminate all use of diskettes, floppy disks, removable disk cartridges and removable hard drives from the network unless a verifiable and tamper-proof usage record can be left. At least a quarter of the cost of ownership can be traced to incidents involving removable media. When a user inserts incompatible or faulty software, he creates conditions that magnify the demand for support services. Almost every breach in information security is traceable to network access via a removable disk.

Corporate executives sometimes find my information-security observations unduly alarming. To them I say, "It's only a matter of time before a crippling failure of a critically important computer installation takes place. Paranoia — a state of anxiety that somebody may do you harm — isn't always based on imaginary fears. If you can think of a rival who wishes your company harm, then prudence may be essential for survival."

Strassmann (paul@strassmann.com) is adjunct professor of information warfare at National Defense University in Fort McNair, Wash. He recently participated in a one-year study for the U.S. secretary of defense on how to protect the nation's defense information infrastructure.

"The chances of getting a virus are increased dramatically due to the Internet."

says Jonathan Wheat, antivirus lab manager at the National Computer Security Association

71% of 1,320 poll participants expressed a lack of confidence in the security of their computer networks, according to the fourth annual Ernst & Young/*InformationWeek* Information Security Survey.

1986

1986 Cliff Stoll, Unix administrator at the Lawrence Livermore National Laboratory, uncovers a pattern of unauthorized access. The hackers turn out to be two West Germans who have struck a deal, "Project Equalizer," with KGB agents.

1986 Kevin Mitnick breaks in to the National Computer Security Center's Dockmaster computer by posing as a technician and gaining a user's password.

1986 Often claimed to be the first computer virus, the Pakistani Brain surfaces at the University of Maryland and spreads through the U.S., infecting thousands of systems.

Everybody knows network computing is hot.

Industry analysts know that Tivoli Systems is red hot.

Tivoli customers know that Tivoli software can dramatically reduce the cost of managing network computing. Now that's wicked hot.

You know that network computing technologies such as client/server, intranets and Java are revolutionizing the world of corporate computing. Which is why Tivoli's TME 10™ management solution is, well, hotter than a chili pepper in Texas, our home state. It's the software that manages network computing.

With IBM behind us, Tivoli had a record year in 1996 and an explosive 4th quarter. In the Americas. Europe. Everywhere. TME 10 sales in December *alone* exceeded Tivoli's total revenue for the previous year. Which makes Tivoli one of the most dramatic growth stories in the entire software industry. Ever.

Is it because Tivoli provides the best technology for managing networks, systems and applications across all major computing platforms — MVS,® UNIX, Windows NT, NetWare, Windows and others — from data center to the desktop?

Is it because Tivoli has literally built an industry around TME 10 — allowing customers to choose compatible products from more than 350 leading vendors in our 10/Plus Association?

Or is it because the resources of IBM allow us to deliver our unique management solution worldwide, with unparalleled service and support?

Answer: It's all of the above — and more!

In 1997, as more and more companies around the globe embrace TME 10, look for Tivoli to get hotter – and knock the competition cold. To find out why Tivoli is hotter than a billy goat in a pepper patch, visit our Website at www.tivoli.com.

Tivoli and TME 10 are trademarks of Tivoli Systems, Inc. IBM is a registered trademark of International Business Machines Corporation. UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited. Windows and Windows NT are registered trademarks or trademarks of Microsoft Corp. All other company and/or product names are trademarks or registered trademarks of their respective companies. © 1997 Tivoli Systems, Inc.

Tivoli

Managing Network Computing. ***The Smart Way.***

DECISIONS ARE TOUGHER.

TIME IS **CRITICAL**.

RESOURCES ARE LEANER.

AND THE BUCK STOPS WITH **YOU**.

...HYPE JUST WON'T CUT IT ANYMORE.

Introducing

CFO Vision

THE **POWER** TO
FIGURE IT OUT.

BUSINESS
SAS
SOLUTIONS

919.677.8200 Fax 919.677.4444 In Canada 1.800.363.8397 www.sas.com/vision/

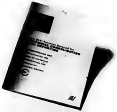
Stop crunching and start analyzing. With CFO Vision you can visualize your business interactively...and gain control of information to spot opportunities and risks faster than ever before. Reengineer the entire process of *financial consolidation, reporting, and analysis*...as you accelerate the flow of information to decision makers at every level of your organization.

With the click of a mouse:

- Understand the facts beyond the figures.
- Improve timeliness and availability of business reporting.
- Analyze every "slice" of your business—from branch profitability to product cost analysis—in any currency.

Powerful, award-winning data warehousing, OLAP, graphics, and EIS capabilities are all included in one fully integrated, easy-to-use solution. It's all yours from one vendor: SAS Institute, with a proven track record for continuous innovation and reliable support at more than 29,000 organizations worldwide...including the *Fortune 100*.

For a free preview of CFO Vision, just give us a call or send us E-mail at cw@sas.sas.com



SAS

SAS is a registered trademark, and CFO Vision a trademark, of SAS Institute Inc.
Copyright © 1996 by SAS Institute Inc.

PRODUCT REVIEW

Antivirus Software

New tools protect against groupware-borne viruses

Holding the FORT

By Thomas S. Parkhurst

LINKING INTERNAL NETWORKS to the Internet brings the world to your front door. But it can also let a few unwanted guests in the back door in the form of viruses.

Users may unwittingly foster the spread of those viruses through popular groupware packages. For example, you can receive infected executables as simple attachments to electronic-mail messages.

And there are groupware-specific security issues. For example, it's possible that viruses could alter the functionality of some standard buttons in Lotus Development Corp.'s Notes or that hot spots could be placed in a Notes form, causing the code to be executed simply by passing your mouse pointer over it.

Client/Server Labs, Inc. has reviewed the following products from three vendors that promise to specifically address groupware virus protection:

- **Cheyenne Software, Inc.'s AntiVirus Agent 1.0 for Lotus Notes and Microsoft Exchange**
- **McAfee Associates, Inc.'s GroupShield 3.1 for Lotus Notes**
- **Trend Micro, Inc.'s ScanMail 1.0 Beta for Microsoft Exchange**

Our test groupware server was a dual 200-MHz Pentium processor with 256M bytes of RAM, running Microsoft Corp.'s Windows NT 4.0. The clients were 166-MHz Pentiums with 32M bytes of RAM configured with Microsoft's NT 3.51. Notes 4.0 and Microsoft Exchange 4.0 were installed on the server.

We collected viruses from several sources. They included a mix of executable viruses and document macro viruses. During the course of the review, we also received several experimental viruses that were specific to Notes buttons and forms. Although no native Notes viruses have been reported outside of testing and development laboratories, we felt it would be valuable to include those viruses in our tests.

Overall, each product did the job it was intended to do — prevent virus infection within the groupware environment. Each also demonstrated strengths in particular niches.

Cheyenne's two protection suites provide consistency in installation, operation and maintenance for organizations that have more than one type of groupware package. McAfee's unique protection against native Notes viruses — spotting them before they're found in distribution — may appeal to corporations that have experienced losses from attacks of unknown viruses.

And Trend Micro provides a simple, integrated package for basic Microsoft Exchange virus protection. The package is easy to use and maintain.

Holding the fort, page 74

Parkhurst is a senior software developer at Client/Server Labs, Inc. (www.cslinc.com) in Atlanta, a primary test lab partner of Computerworld.

MCI

Only **15%** of respondents incorporate encryption and only **28%** incorporate firewalls into their security strategy, despite their concerns about Internet access, according to Datapro Information Services' Computer Security Issues: 1996 Survey.

In Datapro Information Services' 1996 International Survey on Information Security, **57%** of those reporting security incidents said the perpetrators were current employees.

1988

1988 Robert Morris Jr.'s "Internet Worm" cripples Internet traffic.

1988 The Jerusalem virus is discovered at Hebrew University. On Friday the 13th, the virus erases a drive, after having first generated trash to fill up disk space and slow down the system.

1988 For months, Kevin Mitnick, 25, secretly monitors the E-mail of MCI and Digital security officials. Digital accuses him of causing $4 million worth of damage to computer operations and stealing $1 million worth of software. Mitnick is convicted and receives a one-year jail sentence.

CONTINUED FROM PAGE 73

AntiVirus Agent 1.0 for Notes and Exchange

Cheyenne Software, Inc.
www.cheyenne.com

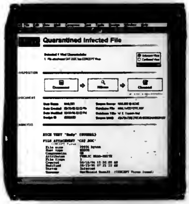
CHEYENNE IS THE ONLY VENDOR of the three we included in our testing that offers antivirus options for Notes and Exchange. The groupware software — AntiVirus Agent for Lotus Notes or AntiVirus Agent for Microsoft Exchange — is bundled with Cheyenne's client software (InocuLAN 4 for Windows NT) and with its server backup utilities on one CD, the Cheyenne Protection Suite for Windows NT. Both AntiVirus Agents require InocuLAN, which manages the virus detection and cleaning.

Limited approach for Notes

The Cheyenne Protection Suite for Lotus Notes takes a much more limited approach than does the McAfee product. Cheyenne protects against only proven Notes risks by examining all documents attached to E-mail messages and Notes databases. At this time, it doesn't attempt to check for native Notes viruses or other possible security loopholes. It doesn't provide facilities for the scanning of encrypted files.

Full protection

The Cheyenne Protection Suite for Microsoft Exchange, on the other hand, provides the full set of protection features that are available through Trend Micro's ScanMail, with the exception of the Virtual Virus Hospital. But InocuLAN has many nice features that improve server security and ease maintenance. InocuLAN can be configured with a Virus Wall. The wall prevents workstation infection of the server by stopping an infected file from being copied to a server and replacing it with a clean version of the file. InocuLAN can scan all files moving among mapped drives. It can also provide floppy disk drive protection on the server. All file downloads to the server through the Internet are also scanned before they are saved. Cheyenne helps to ease maintenance of a large Microsoft Exchange installation by creating InocuLAN Domains that group several Exchange servers into logical domains.



GroupShield 3.1 for Notes

McAfee Associates, Inc.
www.mcafee.com

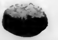
MCAFEE'S GROUPSHIELD 3.1 boasts real-time virus detection and removal on incoming and outgoing messages; good client interfaces to manage real-time scanning and user-initiated database scans; and a virus quarantine area for diagnosis and cleanup of virus-infected files.

Distinctions

GroupShield is the only product reviewed that protects against native Notes macro viruses and other security loopholes in Notes. McAfee has adopted a better-safe-than-sorry approach by setting up protection before these viruses infect the public. GroupShield can identify documents that contain potentially malicious code and disable the questionable code. GroupShield also scans encrypted messages as they are opened by the user.

The downside

GroupShield has a few problems. The product was developed by two companies. Sybari Software, Inc. produced the Notes support with a command line interface to the McAfee antivirus engine. This creates a few maintenance and installation issues that should be mostly resolved in Version 3.1.3, which is scheduled to be released early in March. And the process of updating the virus definition files, which should be done monthly, is tedious.



TOP FIVE SECURITY INCIDENTS GLOBALLY

1 Viruses and malicious code **64%**
2 Password exposure **27%**
3 Theft of computer equipment **27%**
4 Information leaks **13%**
5 Insufficient security **12%**

Source: Datapro Information Services' 1996 International Survey on Information Security

SIGNS OF VIRUS INFILTRATION

Sluggish disk access
Data or program files are damaged
Applications take longer to load
Rare or unusual error messages appear
Memory becomes constrained

Source: Gartner Group

1988

1988 The Stoned virus appears. It infects boot records on disks and hard drives and leaves behind the message "Your PC is now stoned!"

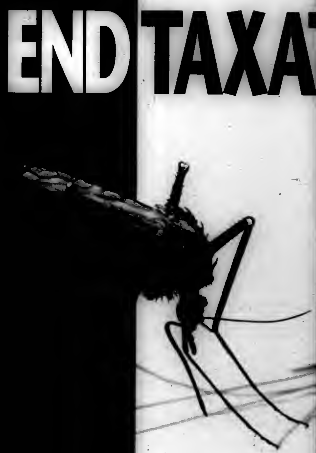
1989

1989 The Worms Against Nuclear Killers worm is released. It seeks out privileged accounts, modifies command procedures, disables E-mail and changes passwords.

1989 Three participants in "Project Equalizer" are arrested by West German police. The burnt body of another hacker involved is found in the woods.

1990

1990 "Project Equalizer" hackers are convicted of spying for Soviets. They are sentenced to jail but receive probation.



Today, you face an endless swarm of desktops, sites and applications, each draining your precious IT resources. Planning. Deploying. Integrating. Training. Supporting. Migrating.

Enough!

Amdahl delivers integrated technology solutions across and between all major enterprise platforms — including all the professional consulting, integration and support services you need.

For S/390, it's our Millennium family of CMOS-based servers and Spectris storage systems. For Windows NT, it's our EnVista servers and LVS 4500 storage systems. For UNIX, we offer Ultra Enterprise servers and our proven UTS operating system for mainframes. All united with cross-platform connectivity and our A+ Software Application Management suite. Amdahl does it all, data center to desktop, start to finish.

Call Amdahl for a SWAT team over 10,000 strong, passionately committed to your success.

Contact us at (800) 223-2215 or www.amdahl.com.

intel inside

www.amdahl.com

amdahl

BRING US YOUR HARD PROBLEMS™

Enterprise Networking
Internet Applications
X
World-Class Instruction

Do the math.

Your responsibilities are adding up pretty quickly. Managing networks. Creating Internet applications. Driving equipment purchases. Implementing intranet strategies. No one knows more than NetWorld℠+Interop® just how challenging your job has become.

+ The world's most trusted experts
NetWorld+Interop is assembling the world's largest forum of networking, Internet and intranet experts to give you an educational experience unmatched anywhere on the planet.

+ 3 Powerhouse Conferences/76 sessions
Need to build killer Internet/intranet solutions? Taking your network infrastructure to the next level? Want the latest on broadband access technologies? No other single source can give you more strategic insight and sure-fire answers.

+ 50 in-depth tutorials and workshops
NetWorld+Interop is where enterprise computing meets the Internet head on. Our world-renowned instructors will give you the practical know-how you need to simplify your job and supercharge your future.

+ 600 top exhibitors & 1000s of products
This is your chance to meet the industry's premier technology leaders and test drive their latest products, all under one roof and running live on the InteropNet™.

Plan to be in Las Vegas. Because no matter how you add it up, your investment in NetWorld+Interop is sure to pay off—exponentially.

Conference Programs: May 5–9, 1997
Technology Exhibition: May 6–8, 1997
Las Vegas Convention Center

For program details visit
www.interop.com. Register online or call
800-944-4629 or 1-415-372-7090.

NETWORLD+INTEROP 97
Where the enterprise meets the Internet.

© 1996 SOFTBANK Expos. InteropNet is a trademark and Interop is a registered trademark of SOFTBANK Expos. NetWorld is a service mark of Novell Inc. Other names are the property of their respective holders.

"Don't get left in the dust."

SAVE
OVER
73%

☑ **Yes**, I want to receive my own copy of COMPUTERWORLD each week.
I accept your offer of $39.95* per year - a savings of over 73% off the single copy price.

First Name ____ MI ____ Last Name ____
Title ____ Company ____ E-mail address ____
Address ____ City ____ State ____ Zip ____

Address Shown ☐ Home ☐ Business ☐ New ☐ Renew Single copy price $3.00/issue * U.S. Only Canada $95 Mexico, Central/South America $150, Europe $295, all other countries $295.

Please complete the questions below.

1. BUSINESS/INDUSTRY (Circle one)
- 10 Manufacturer (other than computer)
- 20 Finance/Insurance/Real Estate
- 30 Medical/Law/Education
- 40 Wholesale/Retail/Trade
- 50 Business Service (except DP)
- 60 Government - State/Federal/Local
- 65 Communications Systems/Public Utilities/Transportation
- 70 Mining/Construction/Petroleum/Refining/Agriculture
- 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85 Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90 Computer/Peripheral Dealer/Dist./Retailer
- 95 Other ____ (Please Specify)

2. TITLE/FUNCTION (Circle one)

IS/MIS/DP MANAGEMENT
- 19 Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- 21 Dir./Mgr. MIS Services, Information Center
- 22 Dir./Mgr. Network Sys., Data/Tele Comm., LAN Mgr./PC Mgr., Tech Planning, Administrative Services
- 23 Dir./Mgr. Sys. Development, System Architecture
- 31 Programming Management, Software Developers
- 41 Engineering, Scientific, R&D, Tech. Management
- 60 Sys. Integrators/VARs/Consulting Management

CORPORATE MANAGEMENT
- 11 President, Owner/Partner, General Mgr.
- 12 Vice President, Asst. Vice President
- 13 Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
- 51 Sales & Mktg. Management
- 70 Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
- 80 Information Centers/Libraries, Educators, Journalists, Students
- 90 Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase (Circle all that apply.)

Operating Systems
- (a) Solaris
- (b) Netware
- (c) OS/2
- (d) Unix
- (e) Mac OS
- (f) Windows NT
- (g) Windows
- (h) NeXTstep

App. Development Products ☐ Yes ☐ No
Networking Products ☐ Yes ☐ No
Intranet Products ☐ Yes ☐ No

4. Which of the following products do you buy, specify, recommend or approve the purchase of? (Check all that apply.)
- (a) ☐ Internet software
- (b) ☐ Internet browsers
- (c) ☐ Web authoring/development tools

5. Do you use the Internet? ☐ Yes ☐ No

COMPUTERWORLD

B4B7 &

"Don't get left in the dust."

SAVE
OVER
73%

☑ **Yes**, I want to receive my own copy of COMPUTERWORLD each week.
I accept your offer of $39.95* per year - a savings of over 73% off the single copy price.

First Name ____ MI ____ Last Name ____
Title ____ Company ____ E-mail address ____
Address ____ City ____ State ____ Zip ____

Address Shown: ☐ Home ☐ Business ☐ New ☐ Renew Single copy price $3.00/issue * U.S. Only Canada $95, Mexico, Central/South America $155 Europe $295, all other countries $295

Please complete the questions below.

1. BUSINESS/INDUSTRY (Circle one)
- 10 Manufacturer (other than computer)
- 20 Finance/Insurance/Real Estate
- 30 Medical/Law/Education
- 40 Wholesale/Retail/Trade
- 50 Business Service (except DP)
- 60 Government - State/Federal/Local
- 65 Communications Systems/Public Utilities/Transportation
- 70 Mining/Construction/Petroleum/Refining/Agriculture
- 80 Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85 Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90 Computer/Peripheral Dealer/Dist./Retailer
- 95 Other ____ (Please Specify)

2. TITLE/FUNCTION (Circle one)

IS/MIS/DP MANAGEMENT
- 19 Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- 21 Dir./Mgr. MIS Services, Information Center
- 22 Dir./Mgr. Network Sys., Data/Tele. Comm., LAN Mgr./PC Mgr., Tech Planning, Administrative Services
- 23 Dir./Mgr. Sys. Development, System Architecture
- 31 Programming Management, Software Developers
- 41 Engineering, Scientific, R&D, Tech. Management
- 60 Sys. Integrators/VARs/Consulting Management

CORPORATE MANAGEMENT
- 11 President, Owner/Partner, General Mgr.
- 12 Vice President, Asst. Vice President
- 13 Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
- 51 Sales & Mktg. Management
- 70 Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
- 80 Information Centers/Libraries, Educators, Journalists, Students
- 90 Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase (Circle all that apply.)

Operating Systems
- (e) Solaris
- (b) Netware
- (c) OS/2
- (d) Unix
- (a) Mac OS
- (f) Windows NT
- (g) Windows
- (h) NeXTstep

App. Development Products ☐ Yes ☐ No
Networking Products ☐ Yes ☐ No
Intranet Products ☐ Yes ☐ No

4. Which of the following products do you buy, specify, recommend or approve the purchase of? (Check all that apply.)
- (a) ☐ Internet software
- (b) ☐ Internet browsers
- (c) ☐ Web authoring/development tools

5. Do you use the Internet? ☐ Yes ☐ No

COMPUTERWORLD

B4B7 &

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55B MARION OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 55B MARION OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTERWORLD
P O BOX 2044
MARION OHIO 43306-4144

CONTINUED FROM PAGE 74

ScanMail
Public Folders

ScanMail 1.0 Beta for Exchange

Trend Micro, Inc.
www.trendmicro.com

TREND MICRO'S SCANMAIL was scheduled for release late in February. The beta version we reviewed performed very well; it identified and cleaned each of our infected test messages.

ScanMail's features include automatic, real-time scanning when a new message arrives at the Exchange Server, automatic cleaning of infected files and immediate notification of the sender, recipient and administrator of any incidents of viruses. ScanMail also contains a Virtual Virus Hospital for diagnosing and cleaning infected files. It is similar to McAfee's quarantine area. The Virus Hospital includes automatic E-mail links to Trend Micro's Virus Hospital for additional assistance with an infected file. New viruses are constantly being created, and regular updates of virus patterns are necessary for effective virus protection. ScanMail simplifies updating through an easy-to-use facility for updating the list of virus patterns automatically on a prescheduled basis through the Internet. That updated list can be automatically distributed among all Microsoft Exchange servers on a company's intranet.

Limited scope

ScanMail's scope is limited to Microsoft Exchange protection, but Trend Micro distributes a suite of applications that protect the server and client workstations from any other virus threat. There is also a Notes version of ScanMail that is planned for release in March.

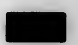
S

DEFINITION: Virus - A software program capable of replicating itself and usually capable of wreaking havoc on the system.

SOURCE: NEWTON'S TELECOM DICTIONARY

DEFINITION: Worm - A computer program that replicates itself. The Internet worm was perhaps the most famous; it successfully (and accidentally) duplicated itself on many systems across the Internet.

SOURCE: NEWTON'S TELECOM DICTIONARY.



1990

1991

1992

1993

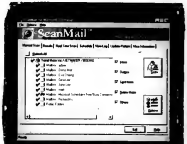
1990 Robert Morris Jr. is convicted and fined $10,000.

1991 A programmer who quit his job at General Dynamics Corp. drops a logic bomb in to its Atlas database before he leaves. He hopes to be rehired at a premium to fix it. It is discovered by another programmer before it goes off.

1992 The Michelangelo virus appears on March 6, the artist's birthday.

1993 California state police issue a warrant for the arrest of Kevin Mitnick. They accuse him of wiretapping calls from the FBI to the California Department of Motor Vehicles and using law enforcement access codes — gleaned from the wiretaps — to illegally gain entry to the drivers' license database.

CONTINUED FROM PAGE 74



ScanMail 1.0 Beta for Exchange

Trend Micro, Inc.
www.trendmicro.com

TREND MICRO'S SCANMAIL was scheduled for release late in February. The beta version we reviewed performed very well; it identified and cleaned each of our infected test messages.

ScanMail's festures include automatic, real-time scanning when a new message arrives at the Exchange Server, automatic cleaning of infected files and immediate notification of the sender, recipient and administrator of any incidents of viruses. ScanMail also contains a Virtual Virus Hospital for diagnosing and cleaning infected files. It is similar to McAfee's quarantirie area. The Virus Hospital includes automatic E-mail links to Trend Micro's Virus Hospital for additional assistance with an infected file. New viruses are constantly being created, and regular updates of virus patterns are necessary for effective virus protection. ScanMail simplifies updating through an easy-to-use facility for updating the list of virus patterns automatically on a prescheduled basis through the Internet. That updated list can be automatically distributed among all Microsoft Exchange servers on a company's intranet.

Limited scope

ScanMail's scope is limited to Microsoft Exehange protection, but Trend Micro distributes a suite of applications that protect the server and client workstations from any other virus threat. There is also a Notes version of ScanMail that is planned for release in March

Norton antivirus tool acts as gateway sentinel

Symantec Corp.
www.symantec.com

YMANTEC HAS EXPANDED its Norton AntiVirus line of products to include antivirus protection for Internet E-mail. The Norton AntiVirus Internet Email Gateways protects networks that use Simple Mail Transfer Protocol (SMTP) gateways. After testing three groupware-oriented antivirus products, Client/Server Labs ran preliminary tests using a beta version of the Norton product.

The Gateways software monitors incoming and outgoing SMTP mail and can be used alone or with groupware antivirus protection software to safeguard E-mail traffic that isn't groupware-specific.

It works by taking over the existing SMTP port. It sits between the SMTP gateway and the Internet. All SMTP mail must pass through Norton Gateways to be certified before it's allowed to enter the corporate network. All this happens transparently and with little performance degradation.

The product is based on the Norton AntiVirus engine with extensions that are specific to E-mail systems. The Gateways software detects and removes viruses attached to E-mail messages in UUENCODE and MIME compression formats as well as the standard .EXE, .DOC and compressed files. Administrators can easily add support for new file types.

Symantec recommends that a company using an SMTP gateway provided by a groupware vendor, should install Norton AntiVirus Internet Email Gateways on a machine other than the groupware server. In our single-server tests with Microsoft Exchange, we found port contention problems for the default SMTP port. That forced us to change our E-mail client'a configuration so it could find the Gateways software. Installing the product on a separate machine eliminates these problems, but creates an extra consideration when pricing the product.

The Gateways software, when used with Symantec's Norton AntiVirus for Windows NT, provides solid antivirus protection for any E-mail server that doesn't use groupware. In a groupware environment, the Norton AntiVirus Internet Email Gateways successfully fills a security hole left open by all groupware antivirus products. — *Thomas Parkhurst*

DEFINITION: Virus - A software program capable of replicating itself and usually capable of wreaking havoc on the system.

SOURCE, NEWTON'S TELECOM DICTIONARY

DEFINITION: Worm - A computer program that replicates itself. The Internet worm was perhaps the most famous; it successfully (and accidentally) duplicated itself on many systems across the Internet.

SOURCE NEWTON'S TELECOM DICTIONARY

1990

1990 **Robert Morris Jr. is convicted and fined $10,000.**

1991

1991 **A programmer who quit his job at General Dynamics Corp. drops a logic bomb in to its Atlas database before he leaves. He hopes to be rehired at a premium to fix it. It is discovered by another programmer before it goes off.**

1992

1992 **The Michelangelo virus appears on March 6, the artist's birthday.**

1993

1993 **California state police issue a warrant for the arrest of Kevin Mitnick. They accuse him of wiretapping calls from the FBI to the California Department of Motor Vehicles and using law enforcement access codes — gleaned from the wiretaps — to illegally gain entry to the drivers' license database.**

MANAGING THOUSANDS OF PCs HAS YOU WAVING THIS
Vanstar
TRY THIS

▼ With thousands of PCs and servers on the frontlines, your IT resources are already stretched to the limit. Call for reinforcements. Vanstar is your global task force for network computing. ▼ Vanstar has designed, deployed and supported distributed networks for the most demanding Fortune 1000 companies. We have the experienced people, proven processes, and advanced systems needed to help you build, manage and enhance your growing enterprise. ▼ Our IT professionals work with your internal resources to support your network in every phase of its life cycle: consulting & design, network planning, integration, procurement, installation, deskside support and network enhancement. With Vanstar, you choose as much, or as little of our expertise as needed. ▼ To turn the tide in your war against rising IT costs and risks, visit the Vanstar web site at www.vanstar.com or call 1-800-994-2345.

Vanstar
THE TECHNOLOGY SERVICES COMPANY
www.vanstar.com

VST
NYSE

©1997 Vanstar Corporation. All trademarks are the property of their respective owners.

Easy access:

Vendors disable security features before shipping

Between the CRACKS

By Alan R. Earls

STELLA JOHNSON

RICK FARROW TELLS OF A VENDOR that routinely shipped its servers "with wild-card features that meant they would automatically trust any machine that logged on to them. For customers opening the box, it was great. The machine was up and running in no time."

Farrow, a consultant in Sedona, Ariz., is asked about the security implications. "For security," he says flatly, "it was terrible."

The biggest security problems — laziness with passwords and too-easy access to data centers, for example — are created by people within the organization. But information systems shops do seek software and hardware with advanced protection against unauthorized access. Vendors in turn happily tout these security features.

Between the cracks, page 80

DEFINITION: Hacker - Hacker has come to mean a person who breaks in to other people's computers with malicious intent. SOURCE: COMPUTER SECURITY INSTITUTE

DEFINITION: Phreaking - Employing technology to attack the public telephone system and get free long-distance service. SOURCE: NEWTON'S TELECOM DICTIONARY

DEFINITION: Dumpster diving - Searching for access codes or other sensitive information found in the trash. SOURCE: NEWTON'S TELECOM DICTIONARY

WIDE PHOTO

1994

1994 Christopher Schanot breaks in to Southwestern Bell's computer systems, and the company spends more than $80,000 on investigation and cleanup.

1994 MIT student David LaMacchia is indicted for releasing more than $1 million worth of pirated software over the Internet. Charges are dropped.

1994 A Texas A&M University professor receives death threats after a hacker logs on to his computer from off campus and sends 20,000 racist E-mail messages using his Internet address.

Between the CRACKS

CONTINUED FROM PAGE 79

Too often, though, the features are disabled before the product ships. In an extreme case, Citibank in New York blamed vendor security lapses for break-ins that siphoned off $10 million.

M. E. Kabay, the Montreal-based director of education at the National Computer Security Association (NCSA), can rattle off a long list of similar debacles.

"Although the industry pays lip service to security concerns, security features are harder to sell," Kabay says.

He says this begins a cycle of laxity in which vendors provide weaker protection, fail to adequately test security features and de-emphasize the information needed to use these features fully.

Daniel Geer, director of engineering at Cambridge, Mass.-based Open Market, Inc.; an electronic-commerce firm, stresses that the greatest dangers stem from corrupt insiders. But he agrees that vendors must share the blame. Geer, who once ran a security consulting firm, says, "The problem is not limited to any particular vendor and includes both hardware and software people."

Security gaps left by vendors often allow easy access through backup systems, which by their nature tend to override normal operational protocols, he says. Individual applications also may have security features turned off, potentially permitting entrance to other parts of the system.

"Vendor accountability is crucial and, unfortunately has been lost

Industry insiders acknowledge there is a problem. "When you are trying to get a product out the door, security features may not be among the top 10 concerns, though customers often demand it later," says Richard Asmuth, senior consultant at Bellcore in Piscataway, N.J. What's more, he says, the locus for security seems increasingly to be in software — within browsers and World Wide Web-oriented products, for example.

But now the issue is getting some attention from the hardware community. Feisal Mosleah, marketing manager of security products at Hewlett-Packard Co., says his company's policy is to ship machines with all security features fully enabled. "It is then up to the customer to turn off those features if they so desire," he says.

But Mosleah agrees there's still a gap between the ordinary security features found on most servers and the expanding security needs of customers. He says HP identified growing security concerns as a market opportunity two years ago and is pushing its dedicated security server, called Praesidium, as a means for coordinating overlapping software security issues across the enterprise.

Neither Digital Equipment Corp. nor Sun Microsystems, Inc. returned calls regarding this story.

Echoing Kabay's contention that vendors sometimes fail to adequately test security features, Dan Kusnetzky, an analyst at International Data Corp. in Framingham, Mass., points out that "environments are very complex, and each is different from the others; vendors simply can't test every possible combination."

But John Haggard and Barry Schrager, both formerly employed at SKK, Inc., a mainframe software firm now owned by Computer Associates International, Inc., say vendors need to take back more of the initiative in addressing glitches, break-ins and viruses when they crop up. "If we [at SKK] found a security/integrity hole, it was treated as a Severity One problem — meaning it had the same priority as our code stopping a mainframe from processing," Schrager says.

Haggard is now president of Vasco Data Security, Inc. in Lombard, Ill., which produces security products based on cryptography and hardware. He says vendor accountability has been replaced by the ad hoc approach of the Computer Emergency Response Teams (CERT) popularized by the NCSA. Haggard says he worries that the CERT approach — publishing detailed descriptions of known problems on the Web — forces organizations to stay on top of the bugs and break-ins, while at the same time providing open access to hackers and criminals. "Vendor accountability is crucial to the whole equation and, unfortunately, has been lost," he says.

But vendor accountability — some might say vendor secrecy — as it was practiced in the mainframe environment of the past is impossible to achieve today, Kabay says. He contends that anything other than universal disclosure of viruses and other security problems compounds problems.

There's still plenty of room for additional user-friendly security measures, according to William J. Orvis, a member of the Computer Incident Advisory Capability team at the University of California Lawrence Livermore National Laboratory in Livermore, Calif. "I would like to see more installation wizards that lead the user through the security settings when a system is installed, forcing him to choose the level of security" that is appropriate, he says.

In the end, though, it's up to IS to demand not only better security features, but that those features be active and properly documented when IS takes shipment of products. "Let's face it," Farrow says. "As soon as the average IS manager gets a machine running, his boss is after him to get going on some other project. Strengthening security doesn't get the attention."

Earls is a freelance writer in Franklin, Mass.

DEFINITION: Trojan horse - Software that appears to do something normal but contains a trap door or attack program. A Trojan horse program can be used to break in to a network through a World Wide Web site.
Source: Newton's Telecom Dictionary

DEFINITION: Cracker - A person who "cracks" computer and telephone systems by gaining access to passwords or by "cracking" the copy protection of computer software. Source: Newton's Telecom Dictionary

1995

1995 Kevin Mitnick allegedly breaks in to Tsutomu Shimomura's system at the San Diego Supercomputer Center on Christmas Day 1994. Mitnick is arrested in January 1995.

1995 A French graduate student cracks a single coded portion of a Netscape commercial transaction by using the combined processing power of 120 workstations at three Paris research institutes.

1995 Two University of California computer science students break the code for another portion of Netscape security in two minutes.

You Can't Survive Without It.

[illegible]

[illegible]

[illegible]

[illegible]

See ICE on the Web: http://www.idg.com/ice

ICE℠
INTERNET COMMERCE EXPO
INTERNET SOLUTIONS FOR THE ENTERPRISE

IDG
An International Data Group Company

ICE, the ICE logo, Internet Commerce Expo and Internet Solutions for the Enterprise, are service marks of International Data Group.

April 8-11, 1997
Georgie World Congress Center
Atlenta, Georgie

September 8-11, 1997
Los Angeles Convention Center
Los Angeles, California

Sponsored by:
COMPUTERWORLD
NetworkWorld
SunWorld Online
CIO
WORLD
WEBMASTER
Java
NETSCAPE WORLD

Please put me on ICE! I would like more information on: ○ Exhibiting ○ Attending ○ Atlanta ○ Los Angeles

Name____________________
Title____________________
Company____________________
Address____________________
City/State/Zip____________________
Phone__________ Fax__________
e-Mail____________________

Mail to: Internet Commerce Expo, 111 Speen Street, PO Box 9107, Framingham, MA 01701 Or Fax to: 508-370-4325 Phone: 800-667-4ICE

CW

Selling yourself
For tips on marketing your skills online, see our Web site at www.computerworld.com

Career Options:

IS pros can expect plenty of action on the front

FIRST LINE *of* DEFENSE

Melanie Menagh

To borrow a quote from a character in a recent movie, having the right mind-set for systems security isn't "a question of whether or not you're paranoid, it's whether you're paranoid *enough.*"

Steve Bellovin couldn't agree more. As co-author of *Firewalls and Internet Security: Repelling the Wily Hacker* (Addison-Wesley Publishing Co.), Bellovin says good information systems security professionals have to be able to put themselves in the mind of their foe.

"You've got to think about the problem the way an attacker

SAFE and SOUND

Skills needed	Percentage that will be hiring this year	Salary premium they are willing to pay
Security	54%	4%
Decision support	36%	3%
Data warehousing	15%	7%
Project management	12%	9%

Source: *Computerworld*'s 1996 Skills Survey; Base: 890 IS hiring managers

DEFINITION: Logic bomb - A program routine that destroys data. For example, a logic bomb may reformat a hard disk or insert random bits in data files. It may be brought into a personal computer by downloading a corrupt public domain program. Once executed, it does its damage right away and then stops, whereas a virus keeps on destroying. Source: Newton's Telecom Dictionary

Sources: Computer Security Institute's "Current and Future Danger: A CSI Primer on Computer Crime & Information Warfare" by Richard Power, senior analyst, National Computer Security Association; Gartner Group, Inc., Ernst & Young LLP/*InformationWeek* Information Security Survey; Datapro Information Services Group's Computer Security Issues: 1996 Survey; Newton's Telecom Dictionary

1995

1996

1995 Vladimir Levin, a Russian hacker, illegally transfers more than $10 million to separate accounts around the world using a laptop PC.

1995 Boza, the first virus to target Windows 95, originates in Australia.

1996 On Aug. 17, a hacker breaks in to the Justice Department's Web page and replaces the site's usual text and graphics with obscene pictures, swastikas and criticism of the Communications Decency Act.

1996 In Los Angeles, Kevin Mitnick pleads guilty to one federal charge of cellular phone fraud and admits to violating probation on an earlier computer fraud conviction.

"You've got to think about the problem the way an attacker would. They're [illegible] get you, and [illegible] aren't going to be playing by the rules."

STEVE BELLOVIN,
AT&T BELL LABS

PETER GODLING

would. They're out to get you, and they aren't going to be playing by the rules," says Bellovin, a researcher at AT&T Bell Labs in Murray Hills, N.J.

"They're not going to be coming in through the front door, they're going to be going around your firewalls altogether. You've got to understand this and act accordingly," Bellovin says.

"Never assume something is secure because the bad guy doesn't know the details," be says. "There are a lot of different ways for security codes to leak. Someone can waltz in at 4:50 p.m. on a Friday afternoon before a long weekend and get past the guards. You want the system to be secure even if the hacker knows everything about your system."

Companies are taking Bellovin's warning seriously — so seriously that security skills are among the top skills that IS managers say they'll be hiring for this year.

The way people in the field tell it, folks with skills in firewalls, network security and cryptography can expect a very rosy future.

"The demand is incredible for s qualified person," says William Ziegler, U.S. director of technology recruiting at Andersen Consulting in New York. "It's spiraled upward heavily in the last five years. There's an urgent need for trained people. We're looking to build from within to help us deliver client value."

There's plenty of job security in IS security jobs. "Unfortunately, it's a growth industry," Bellovin says. "When I look st security problems out there, sbout half could be solved by cryptography; the other half are due to buggy software."

IS security wasn't always such a sure thing. Interest has tended to wax and wane.

"We used to joke sbout it," says John J. Davis, president of John J. Davis Associates, s retainer search practice in New York that specializes in IS management. "Some bank got ripped off by a teller in Los Angeles, and suddenly everybody was interested in security. Then it faded."

That's all changed by the realities of client/server computing and distributed platforms. "Instead of a flash in the pan, we're finding a continuum of interest," Davis says.

GET THE BASICS UNDER YOUR BELT

For those who want to secure s job in this field, IS hiring experts reiterate the need to build security savvy on top of a rock-solid foundation of understanding the basics of the specific technology in play. "You need to be a subject-matter expert," Bellovin says. "If you want to be a Web-security expert, first learn the [World Wide] Web. Learn what makes programs secure or insecure."

"Every new technology has strengths or weaknesses people will exploit," says Dennis Allen, vice president of information security at MasterCard International, Inc. in St. Louis. "Security people need to know technologies inside and out, across the board. They must have a great width and depth of knowledge."

The hot areas for security tend to be those where growing numbers of people are accessing systems — any kind of networking, database or client/server spplications.

"At our shop, security issues encompass networking, internet, WAN, LAN, client/server cryptography and maintaining legacy systems," Allen says. "You have to maintain the old while you're transitioning. Don't count legacy security skills out."

SECURITY SKILL SETS

What sorts of skills are companies seeking, and how can you acquire them? Bellovin suggests a background in auditing and accounting. "The best security people tend to be good systems administrators, people who know how the system is put together and how all the pieces work and interconnect."

Ziegler says to focus on the hot technologies of the day, such as two- and three-tier architectures, Unix, Windows, Oracle Corp. products, Sybase, Inc. products, Microsoft Corp.'s Visual Basic and Powersoft Corp.'s PowerBuilder.

"You need full lifetime design product experience," Ziegler says. "Industry experience is especially important for someone in the security area."

Davis emphasizes sharp organizational and decision-making skills. "You need to be familiar with risk management. You can't cover all bases every time; you have to prioritize what needs to be secure."

Assuring compliance also is an essential aspect of the job description and one reason why many security managers report to the chief of internal auditing.

"You've got to establish parameters," Davis says. "Then put in an audit function to be certain that what's expected is being complied with."

That's easier said than done in many cases. Because of widespread resistance to security measures, one of the most important skills for an IS security manager isn't technical.

"You have to have credibility and integrity," Davis says. "Be self-assured but flexible, with a collaborative style of management. Security issues can't be rammed down people's throats."

[illegible] can expect to be in demand for some time to come.

Menagh is s freelance writer in Maple Corner, Vt.

Fortune 500 Clients. World-Class Solutions.

Are you looking for technical challenge, innovation, fun, and growth? Look no further. We offer you an excellent opportunity to be a key member of our Network and Systems Integration Services (NSIS) team or our Operations Management Services Business Unit (OMS). NSIS and OMS are part of the DIGITAL Services Division, a worldwide services organization with offices in over 100 countries, that provides a full spectrum of services in the areas of Network and Systems Integration, Operations Management Services, and Multivendor Customer Services. You'll play a significant role in the continuing success we've enjoyed by combining our cutting-edge, world-class networking technology with individuals like you who have the ability to create innovative, business-driven solutions for customers. Like implementing a worldwide client/server infrastructure for Citibank, delivering an electronic messaging system that links 120,000 users at Lockheed-Martin, and much more to the Fortune 500.

You make the connection.

We do it all. We do it the best. NSIS and OMS offer high-performance networked solutions and delivers some of the most open solutions in the industry. We provide the platforms, the network infrastructure, the applications, and the services — including those from partners — that make up a networked business solution. Most of all, we provide the creativity and the solutions.

Our rapidly expanding Network and Systems Integration Services group has the following outstanding opportunities now available for top-flight individuals who get a rush out of helping customers reach their business goals.

Solutions Architects You will provide technical and industry expertise, develop business-driven solutions, deliver customer focused consulting and provide revenue and account support in these challenging and rapidly growing segments of the IT market:

- **Mail Messaging and Electronic Commerce**
- **Manufacturing Execution Systems**
- **Applications Development and Integration**
- **Information Management**
- **Communications Industry Solutions**
- **Enterprise Networks and Platform Technologies**
- **Enterprise Applications**
- **Internet/Intranet**

To qualify, you must have in-depth experience in one or more of the following technologies: UNIX, UNIX/NT, TeMIP, MS Exchange, X.400, X.500, Lotus Notes, Database Architecture, Data Warehouse development, Internet Commerce, C++, and Application Migration/Infrastructure. You are especially encouraged to apply if you are a Microsoft Certified Systems Engineer or have made progress towards MS Certification Systems Engineer certification by achieving individual MS certification in the following areas: MS Windows NT Server and Workstation, MS Exchange, or MS SQL.

Program Managers If you have a proven track record in the successful completion of customer programs in the above mentioned market segments – we want you to join us! You will demonstrate and apply industry and technology-specific knowledge in Program Management methodology to plan, control and manage delivery of programs to customers. This includes, but is not limited to, proposal development and submission, program start-up, quality management, P&L responsibility and development of team members. You will also manage customer resources, third-party and sub-contractor resources.

Additionally, the following opportunity is now available with our Operations Management Services Business Unit.

Engagement Managers You will provide technical financial and service feature knowledge in connection with IT systems outsourcing. This involves leading clients in determining their business needs and developing long-term, customized outsourcing solutions for hardware, software and services. To qualify, you must have proven senior-level IT leadership experience in the creation and implementation of large, complex information systems projects and programs focused on business process support and improvement. in addition, the ability to defend technical, financial and operational aspects of complex, multi-million dollar outsourcing solutions is essential. Executive-level consultative selling experience with large, complex outsourcing solutions is preferred. Client/server expertise in one or more of the following areas is also highly desired: distributed systems management, application operations management, desktop management and Internet/Intranet management.

The above positions are available in Albuquerque, Atlanta, Boston, Chicago, Cincinnati, Cleveland, Colorado Springs, Dallas, Dayton, Denver, Detroit, Hartford, Houston, Indianapolis, Irvine, Los Angeles, Metro New York/New Jersey, Milwaukee, Minneapolis, Philadelphia, Phoenix, Rochester, San Francisco, San Jose, St. Louis, and Washington D.C.

DIGITAL offers competitive salaries and full benefits. Please send resume to: Digital Equipment Corporation, C/O: Recruitment Solutions, Dept. 003 OGO, 10 Tremont Street, Boston, MA 02108. Fax: 1-800-773-4599 or E-mail: digital@recruitmentsolutions.com See us on the World Wide Web: www.digital.com/info/careers We are an Equal Employment Opportunity employer.

digital

Whatever it takes.

©Copyright Digital Equipment Corporation, 1997. Whatever It Takes is a service mark of Digital Equipment Corp. Trademarks appearing herein are the property of their respective owners.

Software Engineer: Creates, develops, enhances, customizes and modifies a software system installed in a VAX/VMS operating systems using Vax Rdb to control and monitor manufacturing of products, process orders, and track inventory of raw and finished goods. Creates and develops technical specifications for customization including modification of modules into entire software package to insure proper integration using DECforms for front end design. Performs system testing of modified and new function modules to insure processing performance and data acquisition using C language for batch processing. Will use software module management utilization to control, build, and develop appropriate software modules including use of Visual Basic to be used as graphic user interfaces. Requires Bachelor's degree in Computer Science. Also requires four years experience in the job to be performed. Must have proof of legal authority to work permanently in the U.S. 40 hours per week, 9:00 a.m. to 5:00 p.m. Salary $64,000.00 per year. Please send resume to: Mr. Nofal Gewarges, President, Business Automation Consulting Corporation, 515 Warren Road, Glenview IL 60025. No calls.

Information Systems Analyst. Detroit area health care organization seeks individual to dvlp/maintain/enhance medical automated systems. Dvlp Medicare applics using MS Access. Install/troubleshoot client PC configurations & connections. Install/troubleshoot network h/ware. Use RDBMS to integrate systems/applics into a networked envrmnt (UNIX/Novell). Troubleshoot & assist sun/solaris server installs & configurations. 40hr/wk M-F 8am-5pm. Qualified applicants must possess BS in Comp Sci or Engg & 1yr exp in job offd or 1yr as a systems analyst/consultant. Must have prior exp in a client server envrmnt w/disaster recovery & using RDBMS, FOXPRO, MS Access, MS Office Netware, UNIX, DOS, MS Windows. $42,000/yr. Send resumes to 7310 Woodward Ave, Rm 415, Detroit, MI 48202. Ref No. 131298. Employer paid ad.

Software Engineer: Modifies, designs, develops and implements software system solutions to various workflow business application software systems installed in a client/server networked based environment. Creates and develops data modeling. Logic and physical database design systems, graphic user interfaces, software systems testing and performance evaluation to insure proper functioning of software in a multi-platformed environment. Develops data entry and query screens and implements such screens in a graphic user interface environment using X/Motif. Will use C, Pro C, X-Windows, C, PL/SQL, IPC, and related software engineering tool, in a UNIX environment to modify Oracle relational database software systems. Requires Master's Degree in Computer Science. Also requires one year experience in the job offered. Must have proof of legal authority to work permanently in the U.S. 40 hours per week, 9:00 a.m. to 5:00 p.m. Salary $51,000 per year. Please send resume to: Len Foley, Automated Concepts, Inc. 8770 W. Bryn Mawr Ave., Chicago, IL 60631. No calls.

Programmer/Analyst (Dallas, TX) Ascertain user requirements & perform software support, systems analyses & systems administration under WINDOWS NT, WINDOWS 3.1 & WINDOWS 95 operating systems. Responsible for providing connectivity to UNIX, AS/400, ORACLE, MS-SQL & WINDOWS NT. Responsible for programming & support of MS-MAIL network. 2 year experience in job offered. $80,000/yr., 40 hrs./wk. M-F. Send resume to Marie L'Esperance, H.R. Specialist, COMSYS Technical Services Inc. 675 Third Avenue, 21 Floor, New York, NY 10017

Programmer Analyst to analyze engineering & manufacturing procedures, design & develop software systems for manufacturing & after market systems & facilitate interaction between factory automation system & centralized database; develop simple user interfaces to retrieve & process production information using statistical analyses, graphics & illustration software; participate in design of new applications & modules the data modeling using ADW & Erwin, process modeling using ENVISION; develop codes using C, C++, SQL Windows, Visual Basic 4.0 to create user interfaces, data conversion & loading of mainframe (DB2 & IMS) into ORACLE 7.0 database. Query processing in DB2 using DB2 utilities for exporting data using JCL. Reqs. Bach in Comp. Sci, Electrical, Electronic, Computer, Chemical or Mechanical Engg. or foreign educational equiv. 2 yrs exp in job offered or 2 yrs related exp such as Engineer. Related exp must include computer analyses & developing software systems. Must have used C++, Visual Basic 3.0 ADW, Erwin & Oracle 7.0 $43,000/yr. 40 hrs/wk 8a-5p. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #131996 "Employer Paid Ad"

Sr Analyst Progrmr to lead application of artificial intelligence and operations research methods and algorithms in projects including in line vehicle sequencing, base scheduling, inventory management, and and time production control; work effectively with teams of users and analysts to perform requirement analysis, system definition, design and software implementation. Perform duties using HP workstations, IBM PC, UNIX, X-Windows, DOS, MS Windows, C, C++, Smalltalk, Visual Basic 3.0, Visual C++, G2 Real-Time Expert System, ILOG Solver, TCP/IP protocol, socket level programming, Oracle, MS Access 2.0, Excel 5.0, Excel VBA, 3270 display terminal interface/EHLLAPI, PCL interface, and bar code reading devices interface. Require M.S in Comp. Sci. Will accept equivalent foreign degree. Require 1 1/2 yrs. exp. in job offered or as Researcher which includes computer integrated manufg concentrating in production scheduling and control in automotive industry using Artificial Intelligence and Operations Research methods and Client/Server applications using UNIX, Windows, TCP/IP, Oracle, ProC, and Visual Basic 40 hr wk. 9am-5p.m. $50,000/yr. Send resume to 7310 Woodward Rm 415, Detroit, MI 48202. Ref # 1405-96. Employer Paid Ad.

SOFTWARE ENGINEER — Research, design and develop software in conjunction with hardware product development, for clients. Design and install PC Network using Novell Netware V3.12. Install and configure the hardware including server and work stations network cards and other components such as SCI and CD-ROM. Administrate the installed network, load and configure different applications, troubleshoot and manage end-users. Also provide LAN Administrative services which includes network management, point sharing, file sharing, application sharing and network connectivity. Master's in Computer Engineering. Must have 6 months' exper. as Software Engineer including 6 months exper. or more in the following systems: Netware V3.11, Netware V3.12 DOS, MS Windows 3.1 Lotus UNIX, VAX/VMS, IBM and 6 months exper. or more in the following software: MSWord (MAC and IBM), WordPerfect (MAC and IBM), Wordstar, Ethernet and TCP/IP 40hrs/wk, 8-5, $43,000/yr. Send resume (no calls) to: 7310 Woodward Avenue Rm. 415, Detroit, MI 48202. Job # 132996 "Employer Paid Ad"

Programmer Analyst - Plan, develop and document computer programs, analyze, code, test and document body label system using COBOL II, ISPF and ORACLE. Reqs Bachelor's in Computer Science, Systems Analysis, Computer Information Systems, Computer Engineering, Electrical Engineering, Electronic Engineering, Mathematics or its foreign educational equivalent & 1 yr. exp. in the job offered. $45,000.00/yr, 40 hrs/wk, 8a-5p, M-F Send resume to P.O. Box 1435, Troy, MI 48099. Attention: Jody Zastrow, Decision Consultants, Inc., Include Ref #W4296.

Consultant/Programmer-Analyst (multiple openings), 40 hrs./wk., 8 am-5 pm; $40,945/yr. Job requires: Bachelor's degree in Computer Information Systems or Computer Science in Business Administration & 2 yrs. experience in Job Offered or as a Programmer-Analyst &/or Systems Analyst. Job also reqs. 1) 6 mos. experience developing relational database management systems in a client/server environment using ORACLE 7.x, Lotus Notes 3.2, & RUN Plus; 2) 6 mos. exp using ADT 2.0, & 3) 6 mos. exp using MS Access 2.0. Any exp. reqs. may be met concurrently during the same time period. Job duties: Analyze, design, develop, & implement business applications using Relational Database Management Systems (RDBMS) using Oracle 7.x & MS Access 2.0 in a client/server environment on Windows NT 3.5, Windows 3.1, & DOS 6.x platforms with Novell Network 3.1x. Develop databases in Lotus Notes 3.2 & reports in Lotus Reporter 1.x. Provide on-line Help Systems. Prepare EXEC files for each application with developers advanced tools such as "Access Developers Toolkit 2.0" for in-depth technical documentation. Develop user-friendly screens for the existing applications with graphical user interface tools such as Visual Basic 3.0 & Power Builder 4.0 & Oracle Forms 4.5. Qualified applicants should send resume & verification of reqs. to 7310 Woodward, Rm. 415, Detroit, MI 48202. Ref #1491-96. Employer Paid Ad.

Consultant to consult with clients to ascertain & define their business requirements & utilize technical expertise to provide solutions to client needs; design, analyze & develop 2 tier/3 tier client server applications using Sybase, Oracle in SQL, PowerBuilder, C, C++ in Unix, Netware environments; analyze & understand requirements to finalize on logical/physical design of database using object oriented & structured methodologies architecture of hardware/software in consultation with client, application of object oriented design, analysis & principles to develop GUI in Windows environment; develop object interfaces to database applications & maintain & administer developed database applications for finance, marketing, accounting & business; & determine feasibility of design for clients. Reqs. Master's in Comp. Sci., Comp. Info. Systems, Electrical, Electronic or Computer Engg. or Business. Related exp must include developing computer software system, designing & analyzing software & systems, testing & implementation of software systems for client server application, using PowerBuilder C, C++ & Sybase. $24.05/hr. 40 hrs/wk 8a-5p. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref #132096 "Employer Paid Ad"

Software Engineer: Performs software design, development, testing and upgrade modifications of 5ESS telecommunication switching systems. Performs regression and laboratory testing of software to insure stability and applicability of software to specific customer telecommunication switching systems to insure quality of voice and data transmissions. Analyzes custom retrofitting of such communication switch systems including verification of new functionality using principles of Intelligent Network determine proper interface with existing functionality. Requires Master's Degree in Computer Science, Computer Information Systems or Software Engineering. Also requires one year and six months experience in the job offered, or one and half years of experience as a Systems Engineer & experience in related field, entire experience must include the system testing and analysis of 5ESS switching systems using principles of Intelligent Network for verification of interface functionality. Must have proof of legal authority to work permanently in the U.S. 40 hours per week, 9:00 a.m. to 5:00 p.m. Salary: $25.50 per hour. Please send resume to: Gordon Lin, President, Lintel Communications, Inc., 184 Shuman Blvd., Suite 200, Naperville, IL 60563. No calls.

[illegible]

Friendly faces, wide-open spaces, and a wealth of recreation choices describe life in Pierre, South Dakota, the state capitol. Come manage of state applications development with a $2.9 million budget and a staff of 62 employees.

We seek a manager knowledgeable in development efforts on Intel-based PC's, AS400 and Unix minicomputers and IBM MVS mainframe platforms. Experience with voice response, engineering, GIS, imaging and Internet WWW applications environments and knowledge of hierarchical, relational, object-oriented and client server database environments. Must have strong project management and problem-solving skills.

Bachelor's degree in computer science, information systems or a related field and ten years of progressively responsible applications programming development experience with at least four of those years in a supervisory capacity. An equivalent combination of education and experience may be used to qualify applicants. Salary: $43,139 - $64,729 yearly DOQ Closing Date: March 14, 1997

Please submit a letter of interest and resume to:
Kim Stahl, Human Resources Manager
445 East Capitol Avenue
Pierre, South Dakota 57501
Phone (605) 773-4040 • Fax (605) 773-4047
Internet: [illegible]

State of South Dakota

[illegible]

The School of Computer Science, Telecommunications, and Information Systems at DePaul University, the largest school of its type in the country, is currently seeking qualified, enthusiastic and dedicated professionals to join our part-time teaching faculty. Individuals are needed for both day and evening graduate and undergraduate classes. Academic courses run 10 weeks each quarter; certificate courses vary in length. Opportunities are available for individual and team teaching and for individual class sessions on specified topics.

We offer courses in computer science, information systems, software engineering, telecommunications, data communications, human computer interaction, vision and graphics, LAN/WAN and web technologies, Windows software development and PC software/hardware fundamentals at campuses throughout the Chicago area. Previous teaching experience preferred. To learn more about our programs and the courses we offer, visit the CTI web site at http://www.cs.depaul.edu.

To be considered, submit a cover letter stating area of expertise along with a resume including technical experience, employment history, educational background and teaching experience to **[illegible] or the School of CTI, DePaul University, 243 S. Wabash Ave., Chicago, IL 60604-2302. Please, no phone calls.** DePaul is an equal opportunity employer.

Programmer: Programs, test, debugs, develops and maintains business system data structured programs installed in an IBM mainframe computer system used for the purpose of manipulating and analyzing large statistical data sets of insurance statistics. Uses Assembler and COBOL to perform systems programming in an IBM CICS DB2 database using JCL, TSO and Panvalet for systems program testing and integration purposes. Requires B.S. degree in any Science, Engineering or Computer Science field. Education must include completion of one course in: Programming in COBOL; Programming in Assembly Language; Systems Programming, and, Statistical Computer Packages. Must have proof of legal authority to work permanently in the U.S. 40 hours per week, 9:00 a.m. to 5:00 p.m. Salary: $36,900.00 per year. Please send resume to: Thomas E. Geist, Computer Horizons Corporation, 6400 Shafer Court, Suite 175, Rosemont, Illinois 60018. No calls.

Programmer/Analyst (Variable job sites nationwide). Design, dev. & implementation of ORACLE relational databases. Use of ORACLE tool set & SQL to VAX/UNIX/WINDOWS NT environments. Consultation with users to identify emerging system requirements and modifications. $85,000-$90,000/yr. 2 yrs. exp. in job offered. Please send resume to Marie L'Esperance, COMSYS Technical Services Inc. 675 Third Avenue, 21 Flr. New York, NY 10017

Senior Programmer/Analyst/ Consultant (Chicago area). Consult w/clients to determine problems & requirements; analyze, design, develop, implement, & maintain application systems; interface with users, design & develop programs. Environment: IBM ES 9000, 3090, and PC; MVS/ESA, VS COBOL II, VSAM, DB2, APS, INTERTEST, JCL, REXX, SMARTEST. BS in Comp. Sci or Engg + 2yrs exp in job offered. 40 hrs/w 8-5, M-F, $50K/yr. Must have proof of legal authority to work permanently in the U.S. Send 2 copies of both resume & cover letter to: Illinois Dept. of Employment Security, 401 S. State St.-3 South; Chicago, IL 60605, Attn Mary Wilkes; Ref. V-IL 15565-M. AN EMPLOYER PAID AD. NO CALLS.

Electrical Analysis Engineer - Develop component characterizations & models; interpret results & write comprehensive reports on the computer simulations; develop automotive electrical components for industrial applications; create schematic capture of electrical/electronic systems using Vanguard; conduct electrical system analysis & simulation using Saber; mathematical modeling & computer aided analysis of electrical components, & conduct research & investigate electrical properties & thermal characteristics of semi-conducting devices using Saber. Reqs. Bachelor's in Systems Engineering, Electronics Engineering or Electrical Engineering & 1 yr. exp in the job offered. $36,000/yr. 40 hrs/wk, 9:00a-6:00p, M-F Send resume to: PO Box 1435, Troy, MI 48099, Attn William M. Burns, Executive Director, ed Engineering and Management Services, Inc. Include Ref # W2296.

CDSI
Computer Data Systems, Inc.

[illegible]

Computer Data Systems, Inc.®, (CDSI), a premier information systems company, has immediate openings for software developers, engineers, database programmers & configuration management analysts & other related positions. Most positions require a related BA/BS & skills &/or related exp. in one or more of the following:

Kansas City, MO (includes Omaha, NE & Quantico, VA area)
- Natural/Adabas
- JCL
- UNIX
- FORTRAN
- OS/2
- SABRS
- Oracle, Oracle Forms 4.5
- CBT Development w/ PC Graphics

San Antonio, TX
- Oracle Case/Forms/Reports/DBAs
- Visual Basic, Powerbuilder
- PERL Script, Solaris
- UNIX
- USAF Sensor Edit Systems Spec
- HTML
- IDEF0/IDEF1/IDEF1X
- C/C++

St Louis, MO
- SAS
- Oracle DBAs/Oracle v7
- Network Installation
- UNIX Systems Administrators
- Help Desk/End-User Support

Denver, CO (includes Ft. Collins, CO, Salt Lake City, UT, Dugway, UT, & Colorado Springs, CO area)
- C/C++
- Visual Basic
- UNIX
- Informix, & Windows
- PERL/HTML
- Oracle v7
- Help Desk
- AutoCad
- GIS
- UNISYS 2200

New Orleans, LA
- Mapper Programming Language
- GIS
- ARC/INFO
- Oracle v7-GUI
- Client Server
- Intergraph
- UNIX Systems Administrators

Ft. Worth/Dallas, TX
- C/C++
- FoxPro

CDSI offers a competitive salary & a full benefits package. For consideration, send resume to: **CDSI, Attn: [illegible], [illegible] St., Ste. 600, Ft. Worth, TX 76102.**

Fax: (888)540-2374 E-mail: [illegible]

[illegible] must be included in resume/cover letter. Please specify job & location preference.

Frankenmuth Mutual Insurance Company, a leader in the Property and Casualty Insurance industry, is seeking candidates for current and future opportunities in the Information Technology group:

- **MVS Systems Programmer**
- **Systems / Operations Supervisor**
- **Network Administrator**
- **Agency Company Interface Business Analyst**
- **MVS Applications Developer**
- **Client / Server Application Developer**

The current systems environment includes: MVS/ESA, CICS V2, RACF, JES2, Sterling Software storage management products, CA Librarian, Netware, NT server, and SQL Server. Expansion plans include: OS/390, DB2 for MVS and NT, CICS V4, COBOL II, Microfocus COBOL, C, Smalltalk, Netware 4 and expansion of the NT Server environment to support internet/ intranet applications. The current PMSC Series II CICS / COBOL applications environment will be replaced and enhanced over time with PMSC Series III Client / Server systems.

If you are interested in a challenge with a growing and financially stable company, please submit your resume and salary requirement to: Frankenmuth Mutual Insurance Company, Human Resources-CW, One Mutual Avenue, Frankenmuth, MI, 48787 FAX: 517.652.3586. e-mail: PMCCAIN@CONCENTRIC.NET. Web: WWW.FMINS.COM. EOE

FRANKENMUTH®
MUTUAL INSURANCE COMPANY

Systems Analyst (Columbus, OH) Design, develop & implement financial/administrative applications computer system in COBOL & POWERHOUSE 4GL under ORACLE database employing SQL. 2yrs. exp. in job offered. $49,000/yr., 40 hrs./wk. Please send resume to Marie L'Esperance, COMSYS Technical Services Inc. 675 Third Avenue, 21 Floor, New York, NY 10017

ABSOLUTE OPPORTUNITY

Visual Properties L.L.C. seeks Highly skilled technical personnel to assist in building Internet/Intranet apps using MS VC++ and Java, NT ISAPI, SQLSrv and IIS expertise preferred. E-mail, fax, or mail interest to:

Denise
dj@vizprop.com
fax: 773-348-4241
2801 N. Sheffield
Chicago, IL 60657

CDSI

Advanced Technology. Common Sense Solutions.

Networking for the 21st Century

CDSI provides customers across the country with state-of-the-art technologies that streamline work processes, reduce paperwork and assist in telecommunication efforts. We deliver these advanced technologies because we know that today's progressive business environment requires the innovative concepts of tomorrow. At CDSI, we encourage our employees to take initiative to find common sense solutions for our customers. The positions listed below are located in the Washington, D.C., Maryland and Virginia areas. We are looking for individuals with the following skills:

- **Software Programmers/Developers:** Clipper; Delphi/C++; Delrina FormFlow; IBM,MVS,CICS,JCL,COBOL, AS/400; COBOL Programmers; Lotus Notes, MS Access; MS SQL Server; SAS, IBM MF, Visual Basic, HP3000, COBOL; MVS Systems Programmer; Unisys A-Series: CTOS/BTOS; UNIX or DOS, C: Wildcat, BBS; Cognos: Windows NT; UNIX, SCCS. MIS Specialist: C++. Windows: VAX. ACMS
- **Databases:** Informix DBA; Adabase/Natural; Oracle, DB2 DBA, PowerBuilder, Sybase; FoxPro/Oracle
- **Networking/Communications:** RF Engineer; EDI, EC, ANSI, X12; LAN Administrator; LAN/WAN, Netware 4.1; Senior Network Engineer NT; VMS Network Engineer; X.500, X.400, UNIX
- **Financial Systems:** Mortgage/Business Applications: Accountants, Financial Analysts; Military Payroll Systems
- **Other Key Technologies:** AV Image/LAN, Client/Server, HTML and GUI Development/Delphi; QA/QC SEI or ISO Knowledge; Internet/Intranet Development; Re-engineering
- **Support Functions:** Contracts Administration; Technical Writer; HW/SW Support, Help Desk; Production Control/ VAX, DCL, TSO; MVS Computer Operator; Senior Configuration Manager; Systems Technicians; Training Coordinator

CDSI also has several nationwide opportunities. Along with a leading edge environment, we offer competitive salaries and benefits. Please send your resume noting your area of interest and salary level for consideration to **ATTENTION HRD 1168**. Our E-mail address is **resumes@cdsihq.com** (in ASCII text format), our fax number is (301) 548-2374, and our mailing address is: CDSI, One Curie Court, Rockville, MD 20850. EOE. M/F/D/V

To learn about additional opportunities at CDSI, call our Job Hotline at (301) 921-7199.

http://www.cdsihq.com

CDSI
Computer Data Systems, Inc.®

CDSI and the CDSI logo are service marks of Computer Data Systems, Inc.

---

do YOU want to be a STAR?

Experience the First American difference by providing **S**uperior, **T**imely, **A**ccurate, and **R**esponsive service. It is our superior service that has built First American's solid reputation and bright future. The Corporation is a $9.9 billion financial services holding company, parent of First American National Bank, with over 170 offices in Tennessee, Kentucky, and Virginia, First American Enterprises, and INVEST Financial Corporation. If you want to be a star, choose First American to enhance your career.

Application Systems Programmer/Analyst

Opportunity in Nashville, TN

Working with systems in an MVS/ESA mainframe environment utilizing CICS, VSAM, and DL/I and programming with Cobol, Cobol II, and Assembler, you will perform analysis, design, programming, testing, and implementation of systems and related procedures as well as facilitate the implementation of conversions and upgrades. To qualify, you must have a minimum of 5 years' Cobol and/or Assembler programming experience, 3 years' CICS background, a degree in Computer Programming or equivalent additional experience, and proven ability in programming and system design/integration. Strong analytical, organizational, and effective communication skills essential. Experience with IMS DL/I Hogan, Assembler, and banking applications (check processing) preferred.

Interested applicants, please send resume with salary requirements to: **First American, Attn: SGP-6311, Human Resources, 550 Metroplex Drive, Nashville, TN 37237-7115; FAX: (615) 781-7061.**

Equal Opportunity Employer M/F/D/V

First American
Where banking is still a people business.
Member FDIC

SOFTWARE ENGINEER to analyze user requirements, re-engineer and design telecommunications network element management systems using Rumbaugh's Object Modelling Technique (OMT) for Object-Oriented Analysis and Design; develop systems using C++/UNIX on HP-UX 9000 series workstations; implement Distributed Object Management compliant to CORBA standards using Berkeley sockets, shared memory, semaphores and signals; optimize network protocols using algorithmic optimization techniques; develop business rule based (expert system) hybrid fuzzy decision support systems for different versions of network elements and integrate with the management system; design and develop GUIs using X/Motif and UIMX, and plan and implement Software Configuration Management for the project. Require: M.S. in Computer Science and two years experience in the job offered. Completion of all coursework for Ph.D. in Computer Science with graduate level course-work in Graph Theory & Algorithms, Network Optimization, Expert Systems and Fuzzy Sets with one year of experience will be accepted in lieu of M.S. and 2 years experience. Salary: $53,000 per year. 8 am to 5 pm, M-F. Apply in person or by send resume in duplicate to: Georgia Department of Labor, Job Order # GA 6065311, 2943 N. Druid Hills Road Atlanta, GA 30329-3909 or the nearest Department of Labor Field Service Office.

Computer/Info Technology

Senior O-O Professionals

ALBION INTERNATIONAL, a progressively growing advanced technology software consulting firm, has immediate needs in the Boston/New England area. As a senior software consultant, your mission will be to help clients take advantage of emerging software development methods and techniques within government, finance, manufacturing, and commercial software developer industries.

Qualifications summary:
- Solid background in design and implementation of distributed systems.
- 4GL language experience in OOD. (Will train in Forte.)
- Knowledge in OO Case/OO Methods is a plus.
- Hands-on experience in RDBMS is a plus.

For the right individual, we offer:
- An Employee owned company
- Congenial team environment
- Generous compensation
- Continued training and development in emerging technologies i.e. Forte.

Please contact our corporate recruiter, Kay Norma at (770) 980-6783 or FAX resume in confidence to: (770) 980-6734, E-mail: [illegible]
Equal Opportunity Employer

Join a winning team!

Millbrook Distribution Services

Millbrook Distribution Services is one of the nation's largest distributors of specialty and natural foods, general merchandise, and health and beauty care products. Millbrook is committed to the application of state-of-the-art technology in providing world class value added services for our customers. We are in the process of transitioning from current "Legacy Systems" to an open system/client server environment.

Sr. Vice President, MIS - CIO

We are seeking a seasoned MIS professional to lead our 40 employee team of DP practitioners. This individual will be responsible for formulating and then implementing the change from current "Legacy Systems" to an open system/client server environment. Position requires knowledge of distribution and logistics systems and experience with the retail environment. Demonstrated strength in teaming, interpersonal and communication skills required.

Technical experience should include knowledge of **MVS, DB2, CICS AND CASE TOOLS.**

This position is located at our company headquarters in Central Mass. We offer a comprehensive benefits package including medical, dental, life, and 401K programs. Call (800) 375-5455 ext. 4203# or send resume to: **PDC (SMIS), Millbrook Distribution Services, HR dept., PO Box 35, Leicester, MA 01524.** An equal employer, M/F/D/V.

PROGRAMMER/ANALYST to analyze, design, develop, test, implement and maintain software applications using Passport 4 GL language, C, Motif, X-Windows, Visual C++ ORACLE 6.0/7.0, INFORMIX 5.0 relational database, ERWin, ODBC, RAS, IPC, TCP/IP and Netfiles-provide specialized computer consultancy service to nuclear power plants to track and control radioactive liquid and gaseous release to environment; design and develop Graphic User Interface (GUI) applications, process flow, data flow, ER data modeling, and physical and logical database design; analyze, design and develop software applications working on SUN OS and other UNIX related systems, Windows NT/3.11 and multi-tier client/server architecture. Require: B.S. degree in Computer Science with 2 years experience (M.S. in Computer Science with six months experience may be substituted for B.S. and two years experience). Experience must include Passport 4GL GUI tools, C, Motif, X-Windows, RAS, IPC, Oracle, Informix and TCP/IP programming. Salary: $39,550 per year, 8:00 am to 5:00 pm, M-F. Send resume, in duplicate, to: Georgia Department of Labor, Job Order # GA 6065080, 2943 N. Druid Hills Road, Atlanta, GA 30329-3909 or the nearest Department of Labor Field Service Office.

---

http://careers.computerworld.com

MANAGER OF INFORMATION SYSTEMS

A chemical manufacturing company located in the Charleston WV area is seeking a motivated individual to fill the position of Manager of MIS. This individual will need a Bachelor's Degree and ten plus years experience or a minimum of ten years MIS experience and demonstrated capabilities in data processing and AS400 environment. The successful applicant must have the capability to design, support and troubleshoot the manufacturing information systems to meet the needs of a growing chemical company. This is an exciting and challenging opportunity for a team-based, results oriented individual. You will need to participate in technical projects such as writing policies and procedures for the MIS Department, aid in the designing of computer programs for specified applications, assist in diagnosing and solving computer equipment problems, define equipment needs, work with management to determine information requirements of management and manage the data processing department.

The successful applicant must have skills for technical writing, oral and written communication, problem solving, judgment, innovation and excellent interpersonal skills.

We offer competitive salary plus a comprehensive benefit package. Qualified candidates interested in pursuing this position should send resume and cover letter indicating salary requirements to CW-190124, Computerworld, Box 9171, Framingham MA 01701-9171.

Object Star

PC SAS
$120,000

$1000 Signing Bonus
Immediate openings in Jacksonville, Florida

GLOBAL RESOURCES MANAGEMENT
5111-6 Baymeadows Road
Jacksonville, Florida 32217

IMS/COBOL

$70,000

$1000 Bonus For Easytrieve

DB2/COBOL	66K
NATURAL	72K
PowerBuilder	100K
OBJECT STAR	120K

Immediate openings in Jacksonville, Florida

GLOBAL RESOURCE MANAGEMENT
5111-6 Baymeadows Road
Jacksonville, Florida 32217

LOST IN THE CROWD?

Be SOVEREIGN

At Information Management Resources, Inc. (IMR), our consultants are valued and respected for their unique individual contributions. As an enterprising U.S.-based international software services company, we provide multiple consulting services to a world-wide Fortune 500 customer base in critical areas such as new development, applications management and outsourcing, and migration services (including Year 2000 conversions). Talk with us about the following:

IMMEDIATE U.S.-BASED OPPORTUNITIES!

- **Technical Project Managers/Leaders**
- **Systems Architects**
- **Systems Analysts**
- **Programmer/Analysts**

All opportunities require multi-platform experience in one or more of the following: MAINFRAME: IBM-MF, DB2, IMS-DB/DC, COBOL, COBOL II, CICS, APS, IDMS, ADABAS/NATURAL, Assembler; CLIENT/SERVER/PC TECHNOLOGY: C++, C, UNIX, ORACLE, ORACLE 2000, SYBASE, PowerBuilder, Windows-NT, Visual Basic, IEF 5.3, OOD, GUI and SQL.

In return for your contributions, you will receive competitive compensation and full benefits. ***Inquiries at all levels are encouraged.*** For consideration, please send your resume to Donna Kapinos at: **INFORMATION MANAGEMENT RESOURCES, INC., 26750 U.S. Highway 19N, Suite 500, Clearwater, FL 34621; fax (813) 791-8152; phone (813) 797-7080; e-mail to donna@imr.usa.com**
EOE.

Information Management Resources

MANAGER OF INFORMATION SYSTEMS

A chemical manufacturing company located in the Charleston WV area is seeking a motivated individual to fill the position of Manager of MIS. This individual will need a Bachelor's Degree and ten plus years experience or a minimum of ten years MIS experience and demonstrated capabilities in data processing and AS400 environment. The successful applicant must have the capability to design, support and troubleshoot the manufacturing information systems to meet the needs of a growing chemical company. This is an exciting and challenging opportunity for a team-based, results oriented individual. You will need to participate in technical projects such as writing policies and procedures for the MIS Department, aid in the designing of computer programs for specified applications, assist in diagnosing and solving computer equipment problems, define equipment needs, work with management to determine information requirements of management and manage the data processing department.

The successful applicant must have skills for technical writing, oral and written communication, problem solving, judgment, innovation and excellent interpersonal skills.

We offer competitive salary plus a comprehensive benefit package. Qualified candidates interested in pursuing this position should send resume and cover letter indicating salary requirements to CW-190124, Computerworld, Box 9171, Framingham MA 01701-9171

PROGRAM ANALYST. Responsible for Developing Software & Hardware Solutions for Cable Company's Computational Needs, Designing & Developing and Analyzing Software Programming using System Manager MSP ACC 4000, IBM/CL, QUERY/400, RPG 2/3/400, OS/400 Operations, CBIS/CABLEMASTER PROVIDED BY CBIS, Writing Programs to Design/Create Reports Using SQL/SEQUEL/AS/400, QUERY FOR-ISD/CABLE-MASTER USERS. Converting from cable data to cable master billing system, using Tandem CLX720 and TBOL Operating Systems applying Novell/Netware 3.12, FTP TCP/IP and SNA, SCO UNIX, MSP ACC 4000 ISD on billing system. Required: Bachelor's of Arts with major field of study Mathematics-Computer Science Interdisciplinary. Six months experience in job offered. $35,000.00/year; 40 hrs. week, 8:00 AM to 5:00 PM. Must have proof of legal authority to work permanently in the U.S. SEND 2 COPIES OF RESUME (NO CALLS) to M. Brooks, File C100015-WI DWE-ALC, P.O. Box 7972, Madison, WI 53707-7972. Reference File # C100015-WI. AN EMPLOYER PAID AD.

Start your day...

@

COMPUTERWORLD

www.computerworld.com

CATIA CAD/CAM Design Engineer wanted to provide training and expertise to personnel on the IBM software package CATIA as a computer aided design, engineering and manufacturing tool for the auto industry. Reqs. 4 yrs. exp. in job offered, or 4 yrs. related exp. as CATIA Design Engineer and/or Designer; exp. must include use of IBM CATIA software package as a computer aided design tool for the auto and/or aerospace industries. 50 hrs/wk, 7 am - 5 pm, $49,000/yr. Send resume to: 7310 Woodward Ave., Room 415, Detroit, MI 48202, Reference No. 149196. "Employer Paid Ad."

---

http://careers.computerworld.com

Careers

Recruiting top I.T. grads?

Hiring Techno-MBAs?

Tell 100,000 top Techno-MBAs & I.T. undergrads this spring.

COMPUTERWORLD

SPRING Campus Edition

Issue: April 1997

Recruitment Advertising Close: March 4, 1997

1-800-343-6474, x8000

REGIONAL SCOPE

St. Louis/Kansas City

WHERE COBOL IS KING

In St. Louis and Kansas City, year 2000 conversion projects are driving a frantic search for Cobol programmers

By Steve Alexander

A HEALTHY ECONOMY, low unemployment and year 2000 concerns have combined to make information systems hiring increasingly difficult in the St. Louis and Kansas City, Mo., region.

As a result, wages have risen 20% to 25% in the past two years and employers continue to bid for available local talent and try to recruit from outside the region. Wages are still about 10% below those of the East and West coasts. Employers note that living costs also are lower. But companies in the St. Louis/Kansas City region say their primary out-of-region recruiting grounds are the Midwest and the West rather than the coasts.

"One of the biggest demands is for Cobol experience because there are a lot of large companies in the area that are into year 2000 conversions," says Joe Nemecek, vice president of airline information services at Trans World Airlines, Inc. (TWA) in Kansas City. "There are a lot of legacy systems to convert, such as airline reservation, banking and insurance systems, and if you've got Cobol experience, you can write your own ticket."

"It used to be that getting Cobol people was easier than finding people skilled in client/server, Unix, Internet and C++," says Allan Kalb, a systems director at brokerage firm A. G. Edwards in St. Louis. "But with everybody suddenly aware of the year 2000 problem, Cobol programmers are in high demand."

But newer skills also are hot.

"C++ programmers are most in demand," says Bill Crichton, manager of corporate staffing at SBC Communications, Inc. in St. Louis. He hires IS people for the firm's major subsidiary, Southwestern Bell Telephone Co., which has approximately 1,750 IS employees. "We're also having a lot of trouble finding Oracle programmers," he says.

"The year 2000 problem is sucking up a lot of people right now, but the other people who are in demand are object-oriented developers," says Fred Lanigan, director of information services at BJC Corp. in St. Louis. The company operates five metropolitan-area hospitals and has approximately 260 IS staffers. Lanigan says he expects to hire between 10 and 15 people this year, compared with 10 last year.

UNEMPLOYMENT RATES

Missouri	4.1%
National average	5.2%

Source: U.S. Bureau of Labor Statistics, October 1996 statistics

In the past 18 months, TWA has hired 27 full-time IS professionals — most of them Cobol programmers — to bring its IS workforce to 273. The airline plans to hire approximately the same number of people with the same mix of skills this year, Nemecek says.

A. G. Edwards seeks people with C++, Unix and Internet experience, as well as Cobol programmers. But because of the shortage of candidates, the company is settling for two years of experience instead of the five years it required a couple of years ago, Kalb says. He says he hopes to hire at least 50 people this year to add to the current IS staff of approximately 600.

Southwestern Bell also has aggressive hiring plans for this year. The company hired 266 IS employees last year and plans to hire 200 this year. If the recruiting is successful, about two-thirds of the hires will be C++ programmers, and most of the remainder will be Cobol mainframe programmers. There isn't much demand for managerial talent, Crichton says.

Jason Bell, placement manager for data processing at Robert Half International, Inc. in Kansas City, says there is demand for PC support and help desk people, who earn $24,000 to $30,000 per year; people with Windows NT skills, who earn $33,000 to $45,000; Visual Basic programmers, who earn $30,000 to $40,000; and Cobol and DB2 programmers, who earn $40,000 to $55,000.

RELOCATION NEEDED

Jeannie Jones, vice president of Executive Career Consultants, Inc. in St. Louis, says hiring outside the region is common. "We have huge demand, and the supply of people here is very small. We are relocating people here every day," she says. "All of our clients have to be completely open to relocating the person. If they just want us to search the local market, we generally will not take the work."

American Century Investments (formerly Twentieth Century Services, Inc.), a mutual fund management firm in Kansas City, is recruiting outside the region.

"We find mainframe programmers here, but we go outside the region for client/server developers," particularly Notes developers, says Bob Sauvageau, chief technology officer at American Century. The company has an IS staff of 350 and expects to hire 70 to 80 IS professionals this year — 10 to 15 more than last year. Among the talent it is seeking are client/server or mainframe developers, specialists in imaging systems and electronic commerce, and computer operators.

Another company that's looking outside the region for client/server talent is MasterCard International, Inc. in St. Louis, which has an IS staff of 360. MasterCard hopes to hire 60 to 70 IS professionals this year — about the same number it hired last year.

The company is looking for IS candidates ranging from recent graduates to those with four years of experience in relational databases, C programming or Unix. Approximately one-third will come from outside the region, says Rob Reeg, senior vice president of systems development at MasterCard.

Alexander is a freelance writer in Edina, Minn.

The St. Louis area could be the gateway to a new IS career

WHAT YOU CAN EARN

Typical IS salaries in St. Louis and Kansas City

CIO/VP	$84,000	$96,000
Senior programmer/ analyst	$37,000	$48,000
Network administrator	$36,000	$47,000
Computer operations manager	$36,000	$51,000
LAN manager	$34,000	$47,000
Programmer/ analyst	$36,000	$39,000

Source: Computerworld's 1996 Salary Survey

PROSPECTIVE EMPLOYERS

The region's largest IS organizations

Southwestern Bell Telephone	St. Louis	1,750
A. G. Edwards	St. Louis	600
MasterCard International	St. Louis	360
American Century Investments	Kansas City	350
TWA	Kansas City	273

ANSWER THE CALL

Sprint Personal Communication Services℠ (Sprint PCS) is taking bold strides into the 21st century as the creative force behind the evolution of wireless communications services.

Our corporate headquarters are located in Kansas City, currently ranked one of the most affordable housing markets in the country. Kansas City offers a unique blend of sophistication, friendliness, excellent school systems and cultural excitement, providing an ideal environment in which to raise a family. Due to our rapid growth and expansion, we have multiple openings available with significant areas of responsibility in our Kansas City corporate headquarters. Immediate opportunities include, but are not limited to, the following:

DIRECTOR OF INFORMATION TECHNOLOGY CLIENT SERVICES

Provides Information Technology support to the Sprint PCS "Customer Care" organization, acting as its "CIO" to facilitate development of business systems requirements and functional specifications. Must have 7-10 years experience managing software development projects using a formal development methodology, with a working knowledge of Call Center business processes and operations. MBA is highly desirable.

IT MANAGER - PRODUCT DEVELOPMENT TEAM

Represents IT on cross-functional teams dedicated to specific product initiatives including roaming, pre-paid billing, wireless data, handset provisioning and privacy, fraud management, voicemail, paging, short message service, Internet applications, calling areas, invoicing or call feature enhancements, and in-building systems. Requires 6-10+ years process knowledge, telecom/wireless experience and large project management including matrix management experience.

DIRECTOR - APPLICATIONS DELIVERY

Directs the planning, scheduling, delivery and integration of off-the-shelf or vendor-developed application systems. Background should include an in-depth knowledge of a Client/Server software development methodology (preferably METHOD/1 and DESIGN/1), familiarity with the communications industry, and strong communications and presentation skills. A minimum of 10 years IT experience and 5+ years managing software development projects required.

SYSTEMS ANALYST - INTERNET DESIGN

Designs complex Internet systems expansion and development projects by researching, designing and developing integrated plans for new systems and/or major expansions. Requires a working knowledge of HTML, JAVA, IIS, Netscape Enterprises, Intranet Explorer, ActiveX, CGI, Shockwave, RealAudio, DNS servers and proxy servers.

QUALITY ASSURANCE ANALYST

Researches and implements IT and software engineering standards and benchmarks IEEE, SEI/CMM, Bellcore, Trillium and TickIT, in addition to assisting process managers in process measurement. Requires 3-7+ years experience in the following: business systems analysis; business process engineering; Client/Server technologies and architecture; and IT organization and metrics.

DATA ARCHITECT - DATA WAREHOUSE

These positions are at a Sr. Systems Analyst level, and will work closely with clients. Activities will include data warehouse and data modeling in an Oracle database environment.

ORACLE DBA - OLAP/EXPRESS

Oracle technician with OLAP and/or Oracle Express, and one or more years solid Oracle tools experience preferred.

ORACLE DBA

This position will deal with the largest, multi-platform, interdependent databases supporting the Company's information systems. Works with internal IT resources, influencing technical decisions and direction. Requires 5+ years Oracle DBA experience.

Sprint PCS offers an outstanding compensation and benefits package. If your career goals are challenge and exploration, then Sprint PCS invites you to share the future with us. Send your resume to: **Sprint PCS, Dept. ITDM/CW, Mailstop MOKCMM0301, P.O. Box 32547, Kansas City, MO 64171. You can fax your resume toll free to 888-485-2240. Or e-mail responses to: pcs300@sprintspectrum.com (Microsoft Word or ASCII formats preferred).** No phone calls, please. We are proud to be an EEO/AA employer M/F/D/V. Also, we maintain a drug-free workplace and perform pre-employment substance abuse testing.

Sprint. Sprint PCS™

And you thought Shakespeare was prolific.

With over 15 million lines of programming code

in our mutual fund recordkeeping system, our programmers make *Hamlet* and *Macbeth* look like a couple of short stories. *Wherefore art thou, programmers?*

Analyst Programmer

- Experienced and entry-level opportunities in an IBM MVS environment
- CICS and/or DB2 is a plus

Workstation Analyst Programmer

- 2+ years experience in a client/server environment
- C/C++ or Smalltalk is required

Network Engineer

- 3-5 years experience in a LAN/WAN environment
- ATM/CISCO routers and switches are a plus

Work with the most functionally rich shareholder accounting and information system in the industry. DST Systems, Inc. is the nation's largest information processor for the financial services industry. Employing over 5,000 associates, including 1,000 DP, DST designs, develops and operates proprietary software systems to provide shareholder information to the mutual fund, insurance and banking industries.

DST Systems, Inc. / 333 W. 11th Street, 3rd floor
Kansas City, MO 64105
phone 1-800-874-0174 / fax (816) 435-8618
See our homepage at www.dstsystems.com

Reveal your classical brilliance at DST℠ DST SYSTEMS INC.

Technical Consultant, 40 hrs/wk, 8-5, $43,531/yr. Engineering design support & development of SONET based systems to provide Distribution of Timing & Network Synchronization using application functionality & protocols (ITU, ANSI, Bellcore) & OSI Networking architectures, services & TCP/IP protocols & SS7, ISDN, & WAN/LAN architectures. Design, implement, & test Network Performance Analysis & Management System using ORACLE PL/SQL procedures, Perl & C/C++ CGI scripts & interface between ORACLE & WWW on UNIX. Design, develop, & test OO tools for Network Management using TCP/IP, C/C++, & UNIX. Min reqs.: MS in Electrical Engineering, 2 yrs in carrying out those duties set forth in the job offered or 2 yrs in network engineering design, development, & testing (to include therein 1 year in TCP/IP & 1/2 year in SONET based Network Synchronization & Distributing of Timing Systems, in ORACLE PL/SQL procedures, in WWW, in Perl & C CGI scripts on UNIX, & in OO design & development tools for Network Management using C++). Apply at the Texas Workforce Commission, Dallas, Texas, or send resume to the Texas Workforce Commission, 1117 Trinity, Room 424T, Austin, Texas 78701. JO#TX7857818. Ad Paid by an Equal Opportunity Employer

---

KAPSTONE

Kapstone Systems, Inc., *based in Kansas City, Missouri, is a leading provider of data warehousing and decision support solutions for the property/casualty insurance industry. Kapstone Systems offers substantial opportunities to motivated individuals that would like to be a part of the foundation group in a fast growing company. Some travel will be required. The following positions are available:*

Database Administrator - Significant experience administering DB2, Informix, Oracle, or SQL Server databases including database design, tuning, and performance monitoring. UNIX experience helpful. Requires the ability to administer and oversee multiple database platforms at client sites simultaneously.

Data Analyst - Experience with logical and physical modeling of data, star schemas, and datamart design. S-Designer experience beneficial.

Programmer/Analyst and Senior Programmer/Analyst - Significant experience writing COBOL or C++. Experience writing SQL and working with Microfocus COBOL.

Project Manager - Experience in coordinating the efforts required to build data warehouses, datamarts, and metadata for multiple clients. The position requires the ability to effectively manage several projects simultaneously.

Business Analysts - Opportunities available for individuals desiring a position as an Information Specialist. Candidates should demonstrate the ability to gather user requirements and develop specifications. Excellent written and verbal communication skills are a must. Current areas of specialization available:

Insurance Specialist - Property/Casualty insurance, decision support systems, and management reporting experience desired.

Financial Specialist - Experience with automated financial business environments, decision support systems and management reporting.

Attn: Human Resources
Kapstone Systems, Inc.
9201 State Line Road
Kansas City, MO 64114

Phone
1-800 208-7075
E-mail
marketing@kapstone.com
Web Site
http://www.kapstone.com

APPLICATION SYSTEMS ANALYST PROGRAMMER (LEAD)

Provide technical leadership for the maintenance and enhancement of DBS E-Series Financial Applications: approve/quality assure all software changes, provide technical direction to call clients, allocate and track work assigned to other programming staff. This position will also provide technical direction on financial system replacement decisions and implementation. Requires Bachelors Degree in Computer Science or related field, or equivalent work experience. Prefer 8 + years experience with financial system conversions and client/server tools.

APPLICATION SYSTEM ANALYST PROGRAMMER

Candidates should have 5 years experience in UNIX, C, Operating system programming interface experience connecting multi vendor environment. A Bachelor's Degree in Computer Science is preferred.

DATABASE ANALYST PROGRAMMER

Seeking an experienced Sybase and Oracle DBA. Candidates should have a minimum of 3-5 years experience developing client server applications utilizing Sybase or Oracle Database Servers. Skills should include logical database design, SQL, and UNIX. A Bachelor's degree in Computer Science is preferred.

SENIOR NETWORK ANALYST

- **Server Systems Manager**

This position provides system management functions for servers, coordinates and performs the installation and on-going maintenance of network servers, devices and implements server management/performance and back-up protection strategies and disaster planning polices, and monitors back-up processes and verifies integrity of media and data. Candidates should have CNE or 3 plus years of experience in Novell server installation and management with at least 1 year of supporting Novell 4.x servers and a strong background in Intel-based hardware support and familiar with server backup methodologies, RAID technology and general familiarity with supporting Novell 4.x server equipment and OS.

BUSINESS SYSTEMS ANALYST - SENIOR

This position formulates/defines business and clinical system's scope and objectives, analyzes solutions to solve complex problems considering computer equipment. Candidates are required to have 2 years experience and a Bachelor's Degree in a related field, or equivalent work experience. Management Engineering experience is preferred. Homecare, DME, and physician office knowledge helpful.

COMPUTER TECHNICIAN

Candidates should have experience in PC/LAN hardware, Windows 95, Windows for Workgroups, MS Office, and desktop applications. Experience with Novell 4.1, communication protocols, and Ethernet is preferred. Candidates should have a Bachelor's Degree, 1 year technical school, or equivalent experience.

Unity Health System offers an excellent salary commensurate with experience and outstanding benefit package including health, dental, and vision coverage, an earned time off program and tuition assistance. Interested applicants may apply in person or fax resume to **(314) 576-2301.**

Human Resources
UNITY HEALTH SYSTEM
425 Woods Mill Road South; Suite 100, Chesterfield, MO 63017

UNITY HEALTH SYSTEM An Equal Opportunity Employer

Software Engineer - Legacy Systems (AS/400) - Multiple Openings: Systems analysis, design, development, testing, debugging, quality assurance, integration, implementation, post implementation support & conversion of complex on-line client-server based accounting, inventory, manufacturing, finance & other business application systems using Relational Database Management Systems (RDBMS), Fourth Generation Languages (4GLs) and other software utilities in a multi-hardware/multi-software environment including IBM mainframes, mid-range and PC systems. B.S. in Computer Science/Engineering/Science (or equivalent) and 2 yrs. experience in job offered or as Programmer Analyst/Systems Analyst are required. Must have appropriate combination of skills as follows: 1 of A and 3 of B; or 1 of C and 3 of B; or 2 of B and 2 of C; or 1 of A and 2 of B and 1 of C. A) Includes software packages BPCS, MAC-PAC, MAPICS; B) Includes languages RPG/400, CL, COBOL/400, SQL/400, Query/400, C; and C) Includes communication/CASE Tools APPC, APPN, SYNON, AS/SET. High mobility preferred. 40 hrs/week, 8 am - 5 pm. [illegible] per year. Qualified applicants should contact or send resume to Ms. Jean Long, Manager, Office of Employment Security, 220 Silver Drive, Pittsburgh, PA 15205. Refer to Job Order [illegible].

Programmer/Analyst -Analyze needs; evaluate proposed & existing systems; write progs & code; enhance & customize s/ware; test, debug, prov. tech. support; use: SAP-RV, SAP-RF, SAP R/2. Bachs/Comp. or Applied or Engg or Math. 2yrs/exp. in job offered. Must be willing to travel & relocate as needed (reimb. by empl.) 40hrs/wk.(9-5)$40,000/yr. Greensboro, NC. Apply to the nearest Job Service office or submit a resume to: Job Service, 2006B S. Elm-Eugene St., Greensboro, NC 27406. All resumes must incl. applicant's Social Security #; & Job Order #NC4063058 & DOT code 030.162-014.

Software Engineer Design, code, test and implement software packages using C, SYBASE, DB-Library. Develop prototypes/systems using Object Oriented methodology, C++, and ORACLE. Convert systems from SYBASE, DB-Library environments to ORACLE, PRO-C environments. Prepare and make presentations, do product demonstrations of software systems to clients. Bachelor of Science degree required in Mgmt., Info. Systems or Computer Science plus 3 years of experience in the job duties described above. Salary: $63,000/year for a 40 hour work week. Apply at the Texas Workforce Commission, FT Worth TX or send resume to the Texas Workforce Commission, 1117 Trinity Room 424T, Austin, TX 78701, JO# TX7858225. Ad paid by an Equal Opportunity Employer

---

Programmer/Analyst -Analyze needs; enhance & modify modules to human resources mgmt system; write specs & code; implement; use: Peoplesoft 4.0, Gupta SQL Quest, UNIX System V & Oracle 7.0 Bachs/Comp Sci or Engg or Math 2yrs/exp. in job offered. Will acc 2yrs/exp. as Prog/Anal in lieu of education; Exp. (job offered or related occ) must incl. 6mos using PeopleSoft 4-0, Gupta SQL Quest, UNIX System V & Oracle 7.0. 40hrs/wk; (9-5) $60,000/yr. At client sites; majority in NC, balance elsewhere. Apply to the nearest Job Service office or submit a resume to: Job Service, 2006B S. Elm-Eugene St., Greensboro, NC 27406. All resumes must incl. applicant's Social Security #; & Job Order #NC4063068 & DOT code 030.162-014.

Consultant Design, develop, implement & test software applications for management information systems in client/server environment. Database design including data modeling. Tools: AS/400; S38; RPG400; CL/400; COBOL/400; SQL/400; QUERY/400; PCSupport/400; B.S. in Computer Science as well as 2 yrs exp. in job offered or as Programmer or Programmer/Analyst required. Previous exp. must include AS/400; RPG/400. 40 hrs/wk, 8am-5pm, $45,000/yr. Must have proof of legal authority to work permanently in the U.S. Send resume to: Cathy Sutton-HR, Whittman-Hart, Inc., 311 S. Wacker Drive, Ste 3500, Chicago, IL 60606. REF #2597. (312) 922-9200.

Walter & Associates
Career Opportunities
Nationwide

We are actively seeking:

- Proj. Mgrs., Team Ldrs.
- Database Specialists
- OO Developers, Architects
- Programmers, Analysts
- Administrators, Engineers
- Network Specialists
- Consultants, Contractors

Skills in any of the following:

- LAN/WAN, TCP/IP
- SmallTalk, C++, Delphi, OO
- Visual Basic, Access, GUI
- UNIX, Windows, AIX
- PowerBuilder, Oracle, Sybase, Informix, Ingres
- SAP, BAAN
- Peoplesoft, Lotus Notes
- COBOL/COBOL II, ALC/BAL
- CICS, DB2, IMS, Adabas, IDMS
- Java, HTML, Web Dev

Walter & Associates
P.O.B. 3358, Olathe, KS
66063-3358 fax: 913-764-8081
e-mail:gwalter@staffing.net

Reserve your place at the hottest conference of the year.

June 8 - 11, 1997
Marriott Rivercenter Hotel
San Antonio, Texas

Call 1-800-488-9204 for info

---

see the following

EMPLOYERS

at COMPUTERWORLD's

IT Careers web site*

ALDON Computer Group
American Bankers Insurance
Baskin-Robbins
Bank One Corporation
Champion International Corporation
The Consulting Alliance
CSC Consulting and Systems Integration
Computer Management Services
Comsys
Electronics For Imaging, Inc. (EFI)
FourGen Software Technologies, Inc.
Genentech, Inc.
Litton Computer Services
Raytheon Electronic Systems
Sanders, a Lockheed Martin Company
Temple-Inland Forest Products Corporation
Titan Corporation - Systems East Division
Unisys - Global Customer Services
Wal-Mart Stores, Inc.
Wisconsin Electric Power Company

***And search for opportunities there too**

http://careers.computerworld.com

TECHNOLOGY THAT TOUCHES THE WORLD.

We're not a bank. We don't issue cards. We don't set interest rates. Stop thinking of MasterCard as a financial institution and start seeing us for what we are-one of the world's most technologically sophisticated global payments franchisees. We are the technical professionals who enable over 22,000 member financial institutions to offer a full range of payment products such as credit cards, on-line and off-line debit cards, ATM cash access and more. In a nutshell, we're the brains behind the bucks!

Our ongoing success has resulted in hundreds of opportunities in the St. Louis area throughout 1997 for professionals with the following experience:

- **UNIX**
- **C**
- **Visual Basic**
- **Frame Relay**
- **VPN**
- **Internet**
- **Oracle**
- **Chip Card & Debit experience (Deluxe or ACI)**
- **TANDEM/TAL**
- **TCP/IP**

If you are ready to reshape the way the world uses money bring your technical talents to MasterCard. Send or fax your resume to: **MasterCard International, Dept. CW, 11885 Lackland Rd., St. Louis, MO 63146. Fax: 314/542-7299.** We scan and process resumes electronically. Please use minimum 12 point black font; do not use underlining, bold, italics or fancy typeface. Equal Opportunity Employer. M/F/D/V.

MasterCard International

You can learn more about our company, our technology and our future by visiting us on the **Web at: http://www.mastercard.com/people.**

---

http://careers.computerworld.com

Careers
COMPUTERWORLD

OUTPUT TECHNOLOGIES
IT OPPORTUNITIES

Get an inside look at an outstanding future as a member of the IS team at Output Technologies...

With more than 20 locations in North America, Output Technologies is a leading provider of full-service business communications solutions. Since 1991, we have enjoyed exciting growth. We applaud the 2,200 associates worldwide responsible for this success.

If you are interested in joining an industry leader revolutionizing imaging and business communication services, challenging opportunities now exist for IS professionals as:

- Applications Support Analysts (Help Desk)
- Programmers (C, C++, Pascal, COBOL) & Programmer Analysts (COBOL)
- Document Design & Development (Print/Mail)
- Sr. Programmer Analysts (COBOL)

Qualified candidates will have experience with:

• Client/Server Technology • TCP/IP • UNIX based Mfg. Software & automation •
• IBM Mainframe environment • 24 x 7 Operations •
• 4 GL Languages • C++ • Windows GUI Design •
• OS/JCL • TSO/ISPF • LAN/WAN • COBOL II • DB2 & VSAM • Pascal
• Windows 3.1 User Interface • DOS PC & Utilities • Structured formatting tool •
• Applications Support & Technical Help Desk • Windows NT • Windows '95 & MS Office •

In addition to a supportive professional setting conducive to growth, we offer training, competitive experience-based salaries & excellent benefits featuring profit sharing, employee stock ownership, 401(k) and a complete insurance package. Send, fax or email resume with salary requirements to: **Human Resources: IT, 2534 Madison, KCMO 64108, FAX (816) 435-3093, email: urschelr@output.net.**

OUTPUT TECHNOLOGIES

An Equal Opportunity Employer.

Programmer/Analyst
Responsible for the design and development of financial and manufacturing system software for company's business clients. Must have experience in design, development and implementation of application software as well as experience in MRP II (MANMAN) AP and OMAR modules utilizing ASK Powerhouse and Fortran languages. Bachelors Degree in Engineering, Computer Science or Business or equivalent required. Must have three years experience in job offered. High mobility preferred. 40 hrs/wk, 8 a.m - 5 p.m., $60,000/yr. Qualified applicants should report/submit resume to Mr. James McCoy, Manager, Office of Employment Security, 6206 Broad Street, Pittsburgh, Pennsylvania 15206. Reference Job Order #2008617.

Senior Systems Analyst (Cedar Rapids, IA, Pittsburgh, PA, & other client sites). Consult w/clients, design, develop, implement, & maintain clients current & proposed systems; define business needs, functional requirements; analyze & develop systems design; identify, analyze, & resolve problems w/operational systems; interact w/users management. Environment: IBM PCs & AIX Workstation in LAN environment; C; X Windows; Shell Scripts; PL/SQL, MS Windows. BS in Comp. Sci. or Math or Engg + 5 years exp in job offered or as Programmer/Analyst. Employer will accept a master's degree in stated fields of study + 2 years exp in job offered or as Programmer/Analyst. $57K/yr. 40 hr/wk; 8-5. Must have proof of legal authority to work in the USA. Send resume to PA Job Center: Ref: Job Order # 1009707; Attn: Mr. Greg Schwing, Mgr., Office of Employment Security, 2100 Wharton Street, Pittsburgh, PA 15203.

Consultant. Design, develop, implement & test software applications for management information systems. Database design including data modeling, Oracle performance tuning & database administration. Tools: PowerBuilder, Oracle; SQL. B.S. in Computer Science as well as 1 yr exp. in job offered or as Systems Consultant required. Previous exp. must include: PowerBuilder, Oracle (SQL, performance tuning & database administration). 40 hrs/wk, 8am-5pm, $53,000/yr. Must have proof of legal authority to work permanently in the U.S. Send resume to: Cathy Sutton-HR, Whittman-Hart, Inc., 311 S. Wacker Drive, Ste. 3500, Chicago, IL 60606. REF #21027 (312) 922-9200.

Make a Difference with... The Staff for Life

The University of Missouri Health Sciences Center has immediate openings for experienced information systems professionals to fill critical roles within the exciting field of medical informatics. Projects to implement new technologies and application suites from IDX and Cerner are currently underway. Come join the Staff for Life and help us set the standard in health-care automation into the next century.

- **Project Manager/Applications**
- **Security Strategist**
- **Network Analyst (Switched Virtual IP/IPX Network, Ethernet, Token Ring, Lan/Wan)**
- **Sr. Business Analyst/Financial Applications**
- **Sr. Business Analyst/Clinical Applications**
- **Sr. Programmer Analyst/Email (CCMAIL, Groupwise, SMTP)**

All positions require a bachelor's degree in computer science or related area or an equivalent combination of education and experience.

Columbia, located in the heart of Missouri, offers a unique blend of cultural, educational, and recreational activities. Additionally, you can anticipate a comprehensive benefit package and competitive salaries. So, if you are an individual seeking a challenging opportunity in a fast-paced professional environment please submit your resume to: **University Hospitals & Clinics, Personnel Department, One Hospital Drive, Columbia, MO 65212, FAX 573-882-8188, or call 1-800-422-8614, 573-882-8186.**

AA/EOE

For ADA accommodations
call (573) 882-8186

BE BEHIND THE WORLD'S LEADING TECHNOLOGIES. AND AHEAD OF YOUR TIME.

CSC is a world leader in the science of information technology and its application to achieve clients' business objectives. Serving both industry and government, we offer a broad range of professional services in management consulting, business reengineering, and information systems consulting, integration, and outsourcing.

CSC is on the lookout for knowledgeable, energetic people to join our team. We are currently interviewing for the following positions, open at various levels, in several offices around the country.

- **Programmer Analysts**
- **Technical Consultants**
- **Business Analysts**
- **Business Consultants**
- **Network Engineers**

The ideal candidates for those positions must be self-motivated, degreed professionals who have a minimum of two years of experience in one or more of the following areas:

- Financial Services Applications - VANTAGE-ONE, LIFE/70, LIFE-COMM, COLOSSUS, COGEN, Client/Server, Hogan Integrated Banking Applications including UMB/CAMS/IDS/ODS
- Programming Languages - COBOL/COBOL II, Microfocus COBOL, Assembler, SQL Windows, C/C++, AionDS, Visual Basic, Microsoft Access, E-Mail Programming, Informix 4GL, Informix New Era
- Life Insurance, property and casualty insurance or banking knowledge preferred
- Network computing experience—Windows NT, TCP/IP, Internet, Lotus Notes
- Spanish/English fluency

You must also demonstrate proven skills in analysis, design and writing. Excellent communications ability a must. Opportunities for foreign/domestic travel may exist.

In return for your contributions to our continued industry leadership, we offer excellent compensation, comprehensive benefits, a generous relocation package, and a commitment to provide opportunities for your ongoing professional development. For immediate consideration, send your resume, cover letter and salary history to: **CSC Continuum, Attn: Human Resources Dept.**, at one of the following addresses:

301 W. 11th Street, Kansas City, MO 64105. Fax: (816) 435-6334.

9500 Arboretum Blvd., Austin, TX 78759-6399. Fax: (512) 338-2311.

5525 LBJ Freeway, Dallas, TX 75240. Fax: (972) 341-6367.

2323 Bryan Street, Suite 1100, Dallas, TX 75201. Fax: (214) 978-7776.

100 Great Meadow Rd., Wethersfield, CT 06109. Fax: (860) 563-5793.

26361 Curtiss Wright Parkway, Suite 2F, Richmond Heights, OH 44143. Fax: (216) 289-1564.

1212 Deming Way, Madison, WI 53717. Fax: (608) 828-5448.

You may also e-mail your resume to: **continuum@csc.com** or call our **Job Line at 1-800-882-1292** for additional opportunities.

For more information about CSC, visit our website. **http://www.csc.com**

An Equal Opportunity Employer M/F/D/V.

CSC

Formed in 1922, Universal Underwriters Group has grown to become the industry's undisputed leader. Specializing in insurance coverage for the automotive industry, we currently have a 30% market share and an A+ rating from the A.M. Best Company. We are seeking individuals for the following positions at our corporate headquarters in Overland Park, KS

EXPERIENCED LAN ADMINISTRATOR

To qualify you must have a 4-year business-related or Computer Science degree, along with experience installing and supporting NetWare 4.1 File Servers in a Token Ring environment. Extensive knowledge of Hardware and Software configuration for IBM PS/2's, NetWare 4.1, and Windows 95. CNA accreditation required; CNE preferred.

TECHNICAL ANALYST

You will assist in the selection, installation, maintenance and evaluation of vendor and in-house supplied PC hardware, software and peripherals. You will also be responsible for setting guidelines and standards accordingly. Qualified candidate must possess a 4-year college degree and 2-3 years of experience in technical PC systems analysis. Candidate must also possess excellent verbal and written communication skills. Project management knowledge as well as some NetWare LAN experience is a plus.

PROGRAMMER ANALYST & SR. PROGRAMMER ANALYST

You will participate in a team of technical professionals to solve a variety of computer application problems ranging from moderately complex to very complex. Performs analysis and/or programming tasks as required to develop new applications or modify existing ones using mainly COBOL or other high-level languages. 1-3 years experience is required. Proficient analytical skills and technical knowledge a must, along with a college degree in Computer Science

TECHNICAL PC ADMINISTRATOR

We currently have a PC Administration Analyst position open. This person will maintain and provide support for production of desktop/laptop PC hardware and software. Position requires a minimum of 2 years experience supporting Windows PC's in a Novell NetWare environment. Extensive knowledge of Windows 3.x and Windows 95 required, as well as Token Ring, IPX, TCP/IP and 3270 emulation software. 4-year college degree is also required. Experience in deploying Windows 95 and Windows NT is helpful. Excellent communication, organizational and project management skills are needed.

We offer a competitive salary, outstanding benefit program and an excellent working environment. For consideration, please send your resume and salary history to: **UNIVERSAL UNDERWRITERS GROUP, Attn: HR, 6363 College Blvd., Overland Park, KS 66211. EOE M/F**

Programmer Analyst to perform measurement of impending release of Sybase SQL Server on Windows NT using standard TPC benchmarks using C language on Windows NT; analyses, design & development of systems & programs; develop applications in client-server environment; develop programs to run from Unix on Sun platform & in Windows NT in C language; perform measurement using other customized benchmarks like PC Mag benchmark; design & develop process automation tools; use of Microsoft Test & KEYPLAY using REXX & CLIST. Rel. exp. must include developing client-server applications & designing & developing process automation tools using KEYPLAY & REXX & using SQL Server, C, Windows NT. Must have used CLIST. Reqs. Bach in Comp Sci, Comp., Electrical or Electronic Engg. or its foreign equiv, 2 yrs exp in job offered or 2 yrs related exp such as Programmer Analyst or Systems Analyst; $62,000/yr, 40 hrs/wk 8a-5p. Send resume to 7310 Woodward Ave., Room 415, Detroit, MI 48202. Ref. #133596 "Employer Paid Ad"

Consultant, Systems Analyst: Consult with client companies at their site to determine needs. Design, develop, adapt, install & debug computer systems (hardware &/or software) as per needs of clients. Analyze & assist in implementation of new systems & troubleshoot any problems. Develop new system specifications, flow charts, manuals, & train clients' employees in use of systems. May use hardware, languages & tools such as: IBM 3090; MVS/XA, TSO, DB2, VS COBOL II, CICS, JCL & QMF. 40 hour wk, 9am-5pm. Salary: $51,600/yr. Requires Bachelor degree in Comp Sci or Comp Eng, & 2 yrs experience in job offered or 2 yrs experience as Programmer/Analyst. Other special requirements: Experience to include use of hardware, languages & tools listed above. Must have proof of legal authority to work permanently in U.S. Send cover letter referencing #MB1 & resume to: Michelle Beaumont, Interim Technology, Inc., 823 Commerce Drive, Oak Brook, IL 60521-9335.

Is Your Career Truly Rewarding?

Do You Feel As Though You Are Making A Serious Contribution?

Or.... Are You Simply Crunching Numbers?

Cerner systems focus on the real meaning of healthcare: caring for the individual. Health professionals using Cerner systems are able to make more effective decisions, deliver care more efficiently and streamline their process.

Cerner is expanding rapidly and is providing qualified computer professionals with an outstanding career opportunity. If you have experience in:

VB	**COBOL**
VC++	**UNIX**
C/C++	**Windows NT**

Or other programming and network/storage software.

We have the following opportunities available:

Team Leaders
Management
Programmer/ Analyst
Systems Engineer
Computer Operator
Storage Management
PC Support
Technical Writers
Business Analysts
Customer Support

CERNER offers an exciting, dynamic environment with excellent benefits.

For confidential consideration, please forward your resume and salary history to:

Cerner
Corporation
2800 Rockcreek Pkwy.
Kansas City, MO 64117
Ref Pos # SB-G248

CERNER®

Cerner uses optical scanning technology.
No phone calls or faxes please.

Visit our web site at www.cerner.com

Recruiting
top
I.T. grads?
Techno MBAs?
spring.

Tell 100,000 top Techno-MBA's & I.T. undergrads this spring.

COMPUTERWORLD
Spring
Campus Edition

Issue: April 1997
Recruitment Advertising Close: March 4, 1997

1-800-343-6474, x8000

---

careers

http://careers.computerworld.com

HOT

We've got the **hottest** jobs the WEB has to offer! DICE has thousands of contract and full-time listings for Programmers, Analysts and Technical professionals to fill open positions for companies nationwide.

What's even better - **we're FREE**, providing detailed information so you can find the right contract or full-time position in your area AND your area of expertise. Take a look for yourself. Please contact DICE @ www.dice.com or telnet dice.com or call up our BBS, using your computer & 1200-28.8 baud Modem, 8-N-1.

ONLINE 515-280-3423
INTERNET telnet dice.com

www.dice.com

DATA PROCESSING
INDEPENDENT
CONSULTANT'S
EXCHANGE

Don't gamble with your job search. Use DICE.

A Service of D&L Online, Inc: 515-280-1144

We're Giving Information Integrity Top Priority.

At Capital One, an information-based marketing company with $12.1 billion in assets under management, information integrity is a top priority. We are harnessing new technologies in OOT, RDBMS, OLTP, client/server and Internet/Intranet. If you are a creative thinker with ideas on how to ensure the integrity of our information systems, you'll want to check out the following Capital One opportunities:

Software Quality Engineers
You will assess our IT-wide quality program, develop processes/standards, coach quality insertion, evaluate project processes/products and implement continual improvements. Knowledge of SEPG, SEI-CMM, MIL-STD-498, QFD, SQA, SCM and repository development is desired.

Contingency Planning Associate
This associate will work on business, network and IS recovery planning. To qualify, you'll need experience in project initiation/management impact analysis and development/implementation of recovery plans/strategies, aware programs and recovery exercises. Three to five years contingency planning experience and knowledge of mainframe/open systems, data/voice communications and LAN/WAN are preferred.

Information Security Consultant
To succeed in this position, you'll need a background in IS and technical security and excellent project management, organizational, communications and interpersonal skills.

Information Security Account Administration Manager
This manager will lead a team of analysts responsible for account administration on multiple platforms. To qualify, you'll need to be a team player with a background in IS, knowledge of security concepts and excellent management/communications skills. Knowledge of mainframe, midrange and open systems environments is preferred.

IT Trainer
We'll count on you to manage the IT training lifecycle, including a competency development process for the professional staff. You'll also lead analyses to identify skill gaps, prioritize skills retraining imperatives and manage the development of curriculums, courseware and various training delivery systems.

Network Security Engineer
This team leader will be responsible for information security architecture, implementation and policies, electronic commerce security and network security reviews. To qualify, you'll need 4+ years' experience in information security, a working knowledge of multiplatform environments with an emphasis on Novell, Unix, Oracle, Internet, intranet and firewall network security; and strong analytical, technical and communications skills.

Unix System Administrator
As the leader of a Tiger Team, you'll assess threats within the Unix environment and develop defense tools. To qualify, you'll need a BS in CS or a related field, 4+ years experience in Unix system administration, a working knowledge of multiplatform environments with an emphasis on Unix platform security and strong analytical, technical and communications skills. Oracle experience is preferred.

All positions require a related BS/BA degree.

You can't top this opportunity to work with the next generation of advanced technology. So forward your resume today to: Capital One, FAX: (804) 967-1483; or e-mail: brandon.ruff@capitalone.com. **Please indicate Source Code EAD3CW06A on all correspondence.**

An equal opportunity employer.

Visit us on the Web-www.capitalone.com

CapitalOne.
IT'S ABOUT INFORMATION

---

unicef
United Nations Children's Fund

SYSTEMS ANALYST

Duty Station: Copenhagen, Denmark (Level P-4)

JOIN ONE OF THE WORLD'S OUTSTANDING SERVICE ORGANIZATIONS

The United Nations Children's Fund with Headquarters in New York, 130 offices throughout the world, and an annual budget of $1 billion, seeks qualified candidates for the position of **Systems Analyst**. We need someone who can take major technical responsibility for the development and implementation of new information technology systems and modifications of existing information technology systems.

Qualifications:

- Advanced university degree, preferably in Computer Science or an equivalent education in related areas.
- Eight years of professional work experience at increasing levels of responsibility, systems complexity and leadership. Experience in all the phases of a system development life cycle. Several years of experience in providing technical leadership for complex systems, system integration and project management.
- Experience with open systems (e.g. UNIX, Novell Netware, Client/Server architecture, MS-DOS, Windows, LAN, WAN and networking and RDBMS essential. Experience/knowledge of ORACLE RDBMS and ORACLE tools required. Experience within finance, procurement and warehousing applications an asset. Experience/knowledge of telecommunications an asset.
- Demonstrated ability to conceptualize, innovate, plan and execute ideas as well as to transfer knowledge and skills. Ability to express clearly and concisely ideas and concepts in written and oral form. Proven ability to lead and supervise a team of programmers, programmer analysts, and consultants. Ability to establish harmonious working relations in an international and multicultural environment.
- Fluency in English and knowledge of another UN working language.

Applications by female candidates are especially welcome. Please send detailed resume, in **English**, **quoting** reference number VN-96-144 to: Recruitment and Placement Section (CW USA), UNICEF, 3 UN Plaza (H-5F), New York, NY 10017, USA. Applications for this position must be received by February 24, 1997. Acknowledgement will be sent **ONLY** to shortlisted candidates.

UNICEF is a smoke-free environment.

SAP

Global requirements
permanent/contract
positions. All R/3 modules
Functional/Technical,
ABAP/4 & Basis
Generous compensation
benefits & visa
sponsorship
Systems America, Inc.
Attn. Recruiting
3945 Freedom Circle,
Suite 520;
Santa Clara, CA 95054
Voice: (408)987-4900
Fax: (408) 987-4920
Email:jobs@systemsamerica.com

DATABASE EXPERTS

[illegible] or desire some challenge? We have outstanding positions for DBA's & DB developers. All DBA / Relo & Fees Paid

Sr. DB Expert to $95k
[illegible] RDBMS's for corp Database expert in planning & integration

Data Warehousing to $75k + stock
Oracle/Unix Project Mgr with strong technical & business skills

Oracle DBA to $70k
Oracle & Unix or Windows for development of large systems

Also:
Database Internals & C++ to $70k
Client/Server & Sybase to $65k
Oracle Manufacturing to $65k
GUI/PowerBuilder to $65k
Informix DBA to $60k

HAMILTON
P O Box900 [illegible], NY 12481
914-679-4050 Fax: 914-679-8704
htp@mhv.net
http://www1.mhv.net/~htp/

INTEGRATED SYSTEMS PROFESSIONALS

A Fast-Growing National Consultancy Offers
Exciting Opportunities for Top Quality Professionals

PROJECT MANAGERS
TEAM LEADERS/ CONSULTANTS

- Long-Term Career Opportunities
- Short-Term And Long-Term Contract Opportunities

EXPERIENCE IN
ALL SAP R/3 MODULES BASIS AND ABAP
Oracle • PeopleSoft • Baan

Performance-based Compensation provides exciting opportunities to experienced professionals. (TO $250K OR $150 PER HOUR FOR EXPERIENCED SAP EXPERTS)

PLEASE FAX RESUMES TO [illegible]
or visit us at [illegible]

IPR INC. INTERNATIONAL PROJECT RESOURCES INC.

Simply the BEST

OREGON → **BEST** CONSULTING

Enjoy the Pacific Northwest lifestyle with the best of the BEST. Projects range from new development for mainframe developers to designing solutions for complex systems integration challenges. Excellent partnering relationships with client base. Generous salaries · cafeteria-style benefits · constant training opportunities. To learn how you can benefit from our growth needs, contact us or send resume to:

BEST Consulting
700 N.E. Multnomah, Suite 1100
Portland, OR 97232
(503) 236-5776 (503) 236-5784 FAX
[illegible]
1-800-224-1286

- Visual Basic • Progress
- Visual C++/MFC
- Windows NT • [illegible]
- Cobol • Oracle • FOCUS

Pacific Northwest

COMSYS
information technology services

COMSYS is a leader in the national IT market with over 3,500 consultants nationwide. COMSYS is a national presence in most local markets. In the Pacific Northwest, there are opportunities in the client/server & mainframe arenas.

Our strong ethics have led to 10 years of strong local market leadership & local success measured in double digits.

COMSYS offers a competitive compensation & benefits package. For immediate consideration, mail, fax or e-mail your resume in a scannable format to:

COMSYS, Inc. 10300 SW Greenburg Road, Suite 230, Dept C, Portland, OR 97223, Fax: [illegible] Tel: [illegible]
Web: http://www.comsysinc.com
E-mail: [illegible]
Equal Opportunity Employer

- Oracle Version 7
- Designer/2000
- Developer/2000
- Oracle Financials/HR
- Visual Basic/Access
- DB2, DBA
- DB2, CSP
- IEF/Composer
- CICS, COBOL
- IMS DB/DC
- Year 2000
- Natural/ADABAS

COMPUTER CONSULTANTS
Be our Valentine! We'll keep you working fine.
You'll *LOVE* our job opportunities

ATTN: ROBIN
WINNT Admin
VAX Sys Mgr
Prog Lead (Perm)
OSF/1 Sys Admin
HP-UX Sys Admin
VAX Operator
Prod Contl CA7,CA11

ATTN: JIM
FORTRAN/C
POWERBUILDER P/A
RPG/400 P/A
POWERHOUSE
VAX Sys Admin
COBOL/H R
Visual Basic P/A
Visual C++ (OOD)

ATTN: LISA
C++/ SQL
ORACLE
EZTRIEVE
NAT /ADABASE
PC Specialist
POWERHOUSE P/A
UNIX Sys Admin

JMR & Associates, Inc

JMRoss & Associates, Inc
9417 Lackland Rd Overland, MO 63114
314-429-7600 (fax)
1-888-429-7677 (toll free)
compworld@jmross.com
http://www.jmross.com

SAP PROFESSIONALS

Fast-Growing National And International Consultancy
With A Reputation For First-Class Consultant Offers

WORLD-WIDE CAREER OPPORTUNITIES FOR TOP QUALITY PROFESSIONALS

▲ *EXPERIENCED PROJECT MANAGERS*	*$ 180 K+*
▲ *TEAM LEADERS*	*$ 150 K+*
▲ *CONSULTANTS*	*$ 100 K+*

CURRENTLY STAFFING PROJECTS IN: **US, Canada, South America and Overseas:** *especially in these skills and industries. R/CO, Basis, ABAP/4, PM, MM, WM, PP, SD, EDI in SAP Environment, Aerospace and Retail Experience in a SAP Environment.* **LI/NYC:** *Marketing/Recruitment and Technology Infrastructure*

*Competitive Compensation With Performance Incentives for Strong Professionals
With Deep Experience. Comprehensive Benefits Package*

**Please Fax Resumes To:516-625-9667;Telephone 516-625-9000;
E-mail: Spear1@interramp.com or visit us at http://www.spearhead.com
Applications treated in strictest confidence**

SPEARHEAD™
System Consultants (US) Ltd.
99 Seaview Blvd Suite 340 Port Washington, NY 11050

PSC **OUR STAFF MAKES US #1,**

WE NEED YOU TO KEEP US THERE!

We have immediate openings in Phoenix, Arizona for highly motivated and career oriented consultants with at least 2 years experience in one or more of the following:

MAINFRAME	**DISTRIBUTED/CLIENT-SERVER**
• SAS/COBOL	• OOA/OOD & C++
• DB2	• Delphi
• IMS	• C/C++
• CICS	• Oracle Designer/Developer 2000
• Method/1	• Sybase or Oracle DBA
• Viasoft Year 2000 Tools	• Web Developers - Java/CGI
• Database Support/Recovery	• Data Warehouse Developers
	• Visual Basic and/or PowerBuilder, SQL
• Any DBA	• Help Desk - NT, SQL Server

**PLEASE CALL, MAIL OR FAX RESUMES TO:
Professional Software Consultants, Inc.
Paul Rosenthal**

**4747 N. 7th St. #424, Phoenix, AZ 85014
(800) 279-4498, Fax (602) 279-1161
[illegible]4192@aol.com**

Member NACCB
A [illegible] Company

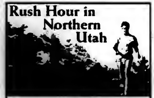
SAP
plementations
L MODULES
ctional • Technical
ABAP • BASIS

Positions throughout
the U.S. and Abroad

Structured Logic Company

**1975 North Park Place
Atlanta, GA 30339
800/599-9550 770/955-1714
FAX: 770/937-0423
e-mail: slc11@aol.com**
EOE • MEMBER NACCB

Rush Hour in Northern Utah



There is no such thing as rush hour in beautiful Northern Utah. What you will discover is an area where thousands of people enjoy an active, healthy life-style, lower housing costs and friendly safe neighborhoods.

Thiokol Corporation is one of the nation's leaders in the development and production of high technology solid rocket motors for aerospace, defense and commercial launch applications and is a major manufacturer of precision fastening systems. The company has plans to double in size over the next two years with the acquisition of a Billion dollar commercial industrial company.

Due to increased internal customer demands our Information Systems Organization has several open positions. If you are interested in talking with us about our needs, please let us know about your background.

Current positions available for experienced or entry level:

- **PROGRAMMERS ....
C, C++, COBOL, MVS, CICS**
- **BUSINESS/SYSTEMS ANALYSTS**
- **CAD/CAM/CAE ENGINEER ....
DEC, Silicon Graphics, UNIX, Windows**
- **LAN ADMINISTRATORS**
- **SYSTEM ADMINISTRATORS ....
NetWare, NT, UNIX**
- **DATA BASE ADMINISTRATOR**
- **DESKTOP SUPPORT ANALYST**
- **NETWORK DESIGN ANALYST**

If you're interested in a career that won't leave you stuck in the slow lane, and be rewarded for your expertise with competitive salaries, complete benefits and a professional environment, mail, fax or E-mail your resume and cover letter in complete confidence to: **R. J. Benford, Thiokol Corporation, 2475 Washington Blvd., MS A53, Ogden, UT 84401. E-mail: BENFORDJ@THIOKOL.COM, FAX: 801-629-2324. Principals only please.** *Equal Opportunity Employer M/F/D/V*

THIOKOL
Aerospace & Industrial Technologies

Computer Science

Are your skills being underutilized?

Andersen Consulting, a global firm engaged in business transformation, has opportunities for management level positions with 8+ years of large-scale systems integration experience for our expanding Telecommunications industry practice.

Process Managers

Requirements include:

- **Functional knowledge in one or more of the following areas: customer contact, billing, service assurance and delivery, network provisioning.**
- **Systems integration project management experience.**
- **Telecommunications industry experience (local or long distance telephone, cable, wireless, or paging).**

Technology Managers

Deep Project Management Expertise In:

- **Leading people in large highly architected complex development environments as a hands on Manager utilizing an effective Methodological and planned approach.**
- **Mastery in technology ranging from Relational Databases, Network Design and Deployment, Client/Server Applications Development, Middleware, and Technology Configuration/Integration.**
- **Point Skills in Call Center Development/Implementation, Network Applications Systems Management, Object Oriented Technology, Legacy Systems with Large Relational Databases, Middleware (messaging architecture, development tools, etc.).**

Andersen Consulting offers competitive compensation packages and the chance to work with some of the best professionals in the industry. For more information about these exciting opportunities, please send your resume and salary history to:
Andersen Consulting, Attn: LH/RA, 1225 17th Street, Suite 3200, Denver, CO 80202, FAX # (303) 291-8782. No calls please. For more information on Andersen Consulting, contact us at http://www.ac.com.
Andersen Consulting is an equal opportunity employer.

ANDERSEN
CONSULTING

© 1995 Andersen Consulting

System Analyst-Integrate, configure, program, test, troubleshoot, & support both hardware & software for personal computer system. Evaluate & test new hardware & software packages to determine compatibility w/existing systems. Modify vendor-supplied device driver programs. Dvlp automated installation & diagnostics programs using C in Unix & Dos. Maintain & support internal networking run in Novell's Netware v3 I & microsoft NT, & database application software written in C & SQL. Provide customer support to resolve computer-related problems. Install & configure DOS v6.22, Windows for Work Group v 3.11 & 95, Unix, Network such Novell's Network, Informax's 4GL, SE, & TCP/IP for Unix, Multi-media software, communication software, & etc. Bachelor in Computer Sci. or Information Systems plus min of 1 yr's exp. in job offered or 1 yr's exp. as systems technician or systems support. Must demonstrate ability to perform job duties through either exp. or course work in Business Data Communication, total exp. must include exp. with (1) Dos & Unix environment, & (2) 4GL, SQL, SE, & TCP/IP. Salary $38,650/ yr. Work 9am to 6pm. Send two resumes to: Georgia Dept of Labor, Job order # GA 6065314, 1535 Atkinson Road, Lawrenceville, GA 30243-5601 or the nearest Dept of Labor Field Service Office.

Secure your Future

CyberSafe

CyberSafe is a leader in the exciting arena of enterprise network security software. Since 1991, CyberSafe has been an innovator in creating commercial products capable of meeting the demands of the World's largest corporations.

CyberSafe offers an excellent career opportunity, a dynamic work environment, and strong compensation and benefits, including employee stock options.

We have multiple openings in the following areas: Security Integration Specialists, Network Integration Specialists, Security Developers (Firewall, intrusion, authentication products), Unix, C System Engineers, Win 16/32 Developers, Senior Network Security Administrators, Senior Sales Support Engineers, Software Product Marketing Managers.

To apply, send resume and cover letter to: CyberSafe Corporation Attn: HR CW 0203, 1605 NW Sammamish Rd. Ste 310, Issaquah, WA 98027 Fax (206) 391-0508 e-mail: jobs@cybersafe.com

For additional information about CyberSafe, the available positions and their requirements, please visit our web site at http://www.cybersafe.com

Equal Opportunity Employer

1-800-NETWORK

The easy way to find network jobs.

You've invested a fortune on training and certification. Now you need to find work that helps you make the most of it. That's where 1-800-NETWORK comes in. We specialize in computer network staffing, and we can help you find rewarding positions faster and more reliably than anyone else. Here's why:

Speed:
If you've got great networking skills, chances are one of our 7 offices has a job that's perfect for you.

Specialization:
We understand the unique challenges facing top-notch networking experts, and we know how to help them succeed.

Screening:
We test and screen our employees so we know what they're capable of. We never place them on assignments that don't match their networking skills and experience.

FREE!

We're looking for:

Admins and Support Staff
User Support & Help Desk
LAN Administration • Net Management Tools
E-mail Administration • Troubleshooting • Maintenance

Installers and Upgrade Specialists
Migrations • Internet and Web Access • Telecommunications
LAN/WAN Connectivity • Configuration and Set-up • Remote Access

Designers and Planners
Network Architects • Systems Engineers • Consultants • Managers

Dial 1 800 NETWORK to be connected to the office nearest you

Atlanta • Boston • Dallas • Denver • Detroit • Los Angeles • Seattle
World Wide Web http://www.1800network.com E-mail mailbox@1800network.com

---

D E Shaw & Co

- **Distributed object-oriented computing (CORBA, DCOM)**
- **Advanced database programming (extended SQL, OODBS)**
- **Web-based computing (Java, CGI)**
- **UNIX and NT operating systems**

D. E. Shaw & Co., L.P. has earned an international reputation for financial innovation and technological leadership. Now we are looking for world-class programmers, senior project managers, software architects, and systems gurus to maintain our technical edge. The D. E. Shaw group is seeking talented candidates to build its substantial proprietary and customer-oriented businesses, as well as to develop start-up units, including a Web-based personal investment service and Juno, the world's first free e-mail service. We are not looking to fill slots. We are looking for outstanding individuals with superlative academic or professional credentials to become vital contributors to our rapid growth.

If you would like to find out about opportunities at any of our offices worldwide, please send your résumé to:

cworld@deshaw.com

D. E. Shaw & Co. does not discriminate on the basis of race, color, religion, gender, national origin, age, military service eligibility, veteran status, sexual orientation, marital status, or disability.

[illegible]

MANAGEMENT CONSULTANT/TELECOMMUNICATIONS. Analyze current data, voice & video LAN, MAN & WAN systems. Design improvements & implement replacements for current systems. Design & implement the following applic's & carrier technologies: LAN to LAN connectivity over private & public MAN for comp. to comp. interconnection, TCP/IP, Internet, Telaph PBX/PABX, key system interconnection; Compressed voice & data sys., Video teleconferencing interconnection & DACS. Carrier technologies to be researched, proposed & implemented to carry the above services consist of: Satellite, MSAT, VSAT, TDMA, CDMA and SCPC; Tropospheric scatter, corporately owned Microwave, corporately owned Fiber optic, Spread Spectrum, Private & public TDM, Statistical multiplexing, ISDN, ATM, Frame Relay, Private & public T1, E1, T3, E3, Sonet systs; Private AM, FM, SSB two way radio systems & private Cellular telephone systs. Must have experience in Data-voice-Video multiplexing, X.25, SN SDLC, HDLC, digital audio, Novell networking, Cisco routers, data & audio matrix switches & voice mail systs. Must be willing to relocate within the U.S. [illegible] Computer Requirements: PC Platforms, IBM, Clones and peripherals. Digital (DEC) Minicomputers including Ethernet. Microprocessors [illegible], [illegible], 8086 and 64000. Software: OPL, SACBOL, CP/M, DECPAL, MSDOS, SCO-UNIX, XENIX, LOTUS-123, SYMPHONY, WordPerfect, Multimate, CAD/CAM, DBASE, XTALK and EMail. Telecommunications knowledge: Satellite data, audio & video systems, C band, KU band, VSAT, MSAT including TDMA, CSMA, CSDA, CSCA. Terrestrial data & audio systs. using copper wire, UTP, coaxial cable, enterprise wiring, fiber optics & microwave systems. Must have 10 years' work experience. Hrs. 9a-5p, M-F, $[illegible] per yr and possible overtime $[illegible] per hour. Apply to Georgia Dept. of Labor, Job Order #GA [illegible], 2943 N Druid Hills Rd., Atlanta, GA 30329-3809 or the nearest Dept. of Labor Field Service Office.

CONSULTANTS

IMMEDIATE INTERVIEWS

MAINFRAME

DB2 or CICS	• AS 400	• PL1
DBAs	• [illegible]	• IMS
Natural 2	• [illegible]	• CICS [illegible]
Cobol	• SAP	• [illegible]
AS/PL1	• CSP	• VAX
BAL	• [illegible]	• [illegible]
Year 2000	• [illegible]	• Qual Assur

CLIENT SERVER

Lotus Notes	• NT [illegible]	• C or C++
Sys/Admins	• [illegible]	• Qual Assur
[illegible]	• Novell	• [illegible]
Oracle	• Unix	• VB [illegible]
Lan/Wan	• Sybase	• [illegible]
Tech Support	• Visual C++	• [illegible]
Help Desk	• TCP/IP	• OOA/OOD
Powerbuilder	• Informix	• [illegible]
[illegible] NT or 95	• CORBA	• Peoplesoft

[illegible] Consulting

[illegible]
[illegible]
[illegible]
[illegible]
Fax [illegible]
or R. [illegible]
[illegible] Cypress Creek Rd
[illegible], Suite [illegible]
Ft Lauderdale, FL [illegible]
[illegible] Fax [illegible]

THE DOCUMENT COMPANY
XEROX

Network Security Architect

To Design And Implement Network Security In A Client / Server Environment

• Understand, develop, and implement electronic security policy • Architect a solution for the corporate Internet that comprehends the requirements of existing connections and new connections • Develop secure solutions for electronic connections to external corporate partners • Lead efforts to design the next generation firewall for access to the Internet • Implement network security solutions

QUALIFICATIONS:

- Comprehensive understanding of current security issues and approaches in networking and Internet access. Expect 5 to 10 years experience in network technologies, and experience designing and implementing network security
- Comprehensive understanding of network protocols such as TCP/IP, Novell IPX/SPX, SNMP, and SNA
- Comprehensive understanding of client and server environments, including operating systems such as UNIX, Novell, DOS/Windows. NT experience is desirable
- Programming experience in a UNIX / C/C++ environment
- Project management experience

Best Places to Work 96

For immediate consideration on this and other positions, e-mail, fax, or mail your resume to: XEROX Corporation, GP&IM Staffing, 100 Clinton Ave South 05A, Rochester, NY 14644. e-mail: [illegible]@[illegible].xerox.com, fax: (716) [illegible]-1374

ARE YOU TIRED OF THE HUSTLE & BUSTLE OF CITY LIFE?

ARE YOU READY TO LIVE CLOSE TO THE GREAT OUTDOORS, WHILE STILL WORKING FOR A PROGRESSIVE EMPLOYER?

Blue Cross and Blue Shield of Montana may be for you. We currently offer the following opportunities in the Helena office.

EXPERIENCED DB2 OR IMS DATABASE ADMINISTRATOR May also use Oracle. For more information contact [illegible] at [illegible]

Experienced MVS Assembler Programmer Analyst Experience with COBOL, IMS, or DB2. May also use Microfocus and Oracle.

Blue Cross and Blue Shield of Montana offers competitive salaries and excellent benefits. To apply for these positions, please send your current resume and salary requirements to: Human Resources, Blue Cross and Blue Shield Montana, PO Box 4309, Helena, MT 59604. These positions close February 28th, 1997. For more information regarding job opportunities, please call our Job Information Line: 1-800-821-[illegible] www.bcbsmt.com

An Equal Opportunity Employer

Systems Analyst Design object models, for client-server software Using Object-Oriented methodologies. Design, develop and implement graphical user interfaces (GUI) using Visual C++. Design, develop and implement software system reports using report generator. Design, develop and implement server system database structure and tables. Design, develop and implement server embedded-SQL programs using UNIX, C and SQL languages. Master of Science degree required in Computer Science plus 1 year of experience in the job duties described above. Salary: $43,000/year for a 40 hour work week. Apply at the Texas Workforce Commission, Ft. Worth, TX or send resume to the Texas Workforce Commission, 1117 Trinity, Room 424T, Austin, TX 78701, Job TX [illegible]. Ad paid by an Equal Opportunity Employer.

Programmer/Analyst. Analyze needs, enhance & modify modules to human resources mgmt system; write specs & code; implement; use: Peoplesoft 4.0, Gupta SQL Quest, UNIX System V & Oracle 7.0 Bachs/Comp Sci or Engg or Math 2yrs/exp. in job offered. Will acc 2yrs/exp. as Prog/Anal in lieu of education. Exp. (job offered or related occ) must incl. 6mos using PeopleSoft 4.0, Gupta SQL Quest, UNIX System V & Oracle 7.0. 40hrs/wk; (9-5) $50,000/yr. At client sites; majority in NC, balance elsewhere. Apply to the nearest Job Service office or submit a resume to: Job Service, 2006B S. Elm-Eugene St., Greensboro, NC 27406. All resumes must incl. applicant's Social Security #; & Job Order #NC4088058 & DOT code 030.162-014.

Computer Jobs.
[illegible]

http www
SelectJOBS
com

954 424 0563

Prism Consulting Services, Inc. an established international information technologies firm founded in 1985 a expanding. Immediate hire opportunity for talented, self motivated professionals with the following:

SAP - To Six figures
Peoplesoft/Peoplesoft Financial to Six figures
Tech Support - Decnet, Open VMS, SLS, Pathworks, SWXCR Raid 5, All in 1 $60's
P/A's Java, HTML, Oracle, C, C++ New Development Several spots $50's
Testers JAVA, HTML, C, C++, SQA test tools a plus $50's
HP 3000, ASK, Cobol or Fortran $40's
Cobol, CICS, IDMS $40's
Cobol, Adabas Natural $40's
IT sales - Base, Commissions, benefits

Above positions are available at multiple Prism sites throughout the U.S. Call or send resume immediately to Director of Recruiting, Prism Consulting Services, Inc., 180 Interstate North Parkway, Suite 290, Atlanta, GA 30339. Phone: 770-952-7125 Fax: 770-952-7301
E-mail: harriet@mindspring.com

M&D/MSA EXPERTS

The opportunity of your career

Nationwide consulting firm with over 150 DBS customers seeking appls/tech experts to help our clients with year 2000 and/or to migrate to Oracle/PeopleSoft. Salary and Bonuses to over 100K.
Positions all across the USA.
Minimal travel/Train in Oracle/PS
Oracle/PS Fin Apps/HR installs

Chris Falco 800-767-7017 ext 12 • Fax: 800-241-2628
Grace Consulting
Visit our Website. www.gracetech.com

SAP

We specialize in:
The placement of SAP professionals - all modules, ABAP BASIS.
Contract & Permanent Positions Available Nationwide.
We have low overhead so we can pay you top rates.

People Unlimited
1811 Sardis Rd N., Ste. 210
Charlotte, NC 28270
Phone 704-841-1118
Fax 704-845-1052

PeopleSoft

We specialize in the placement of PeopleSoft Professionals —all modules. Contract & permanent positions available nationwide.

TransTech
client/server solutions

Attn: Craig Stevens
Tel. 1 800 876 7374 ext. 27
FAX +1 [illegible] 717.[illegible]
[illegible]@trans-tech.com
www.trans-tech.com

Marketplace

COLOR

OVERSHADOWS BLACK AND WHITE

By Suruchi Mohan

COLOR IS THE LATEST EXCITEMENT in the mature world of personal desktop printers. And leading the charge is the ink-jet printer, which works well in the personal desktop space.

While personal and network printers can be considered desktop machines, the kind of performance that makes a desktop printer "personal" varies depending on which analyst you ask. Typically, any printer that produces less than 8 to 12 page/min. is a good bet in the monochrome (black and white) ink-jet arena. The average range for color ink-jet printing is 1.5 to 3 page/min.

Some personal desktop laser printers may produce as many as 24 page/min., says Bill Gott, president of Ventura Market Strategies in San Jose, Calif.

When laser printers produce more than 30 page/min., they don't classify as personal printers. But there is an overlap, and printer speeds of more than 12 page/min. work for networks, analysts say.

"Color is becoming mainstream," says Ed Pullen, director of printer market research at Computer Intelligence in La Jolla, Calif. Sales of color ink-jet printers surged last year. "There is a story behind the numbers. PC users are embracing color printing for business, pleasure and other applications," he says. The color quality is outstanding, and a lot of users are in replacement mode. They are swapping their old dot matrix printers for color ink-jet printers.

Lyra Research in Newtonville, Mass., predicts the market for four-color business printers that cost less than $500 will increase from 662,200 units sold in 1996 to about 2.3 million units sold by 2000.

Ink-jet printers — monochrome or color — are the most popular, according to Keith Waryas, an analyst at International Data Corp. in Framingham, Mass. Monochrome and color ink-jet printers represent about 71% of the printer market. The color ink-jet printer has taken over the monochrome market because of its low price, speed and performance.

Hewlett-Packard Co. leads the color ink-jet market with an estimated 55% share of the market, according to IDC. The company's latest personal desktop printer is the DeskJet 870C family, which features both black-and-white and color printing. It also works on peer-to-peer networks. It can print up to 8 page/min. in monochrome and 4 page/min. in color. Prices start at $499.

Canon Computer Systems, Inc. and Epson America, Inc. rank second and third in the color ink-jet market, with 25% and 9% of the market respectively. Canon's BJC-4550, which costs $499, prints 5 page/min. in black and white and 1 page/min. in color. Epson's Stylus Color 500 prints in black and white and color. Its speed is 4 page/min., and it costs $289.

But the enthusiasm for color doesn't mean black-and-white printers are obsolete. HP's LaserJet 6 Series printers, which consist of the LaserJet 6P and the 6MP, are a case in point. Announced in the fourth quarter last year, they are expected to cost less than $900 and offer speeds of up to 8 page/min. NEC Technologies, Inc. shipped the SuperScript 869 laser printer last year for just under $500, and Xerox Corp.'s 4508 Personal Laser Printer costs less than $800.

Laser printers come in color, too. But their high price — typically above $4,000 — makes them better-suited to networking environments in which several users can share the technology.

Next week's Marketplace will explore network printers.

Mohan is a freelance writer in Mountain View, Calif.

Personal desktop printers:

COLOR INK-JET PRINTERS
By market share.

Hewlett-Packard Co.,
Palo Alto, Calif.
(800) 752-0900.
www.hp.com

Canon Computer Systems, Inc.,
Costa Mesa, Calif.
(800) 848-4123
www.ccsi.canon.com

Epson America, Inc., *Torrance, Calif.*
(800) 463-7766
www.epson.com

Apple Computer, Inc., *Cupertino, Calif.*
(800) 462-4396.
www.apple.com

Lexmark International, Inc., *Lexington, Ky.*
(800) 358-5835
www.lexmark.com

Source: International Data Corp., Framingham, Mass.

Call Today to Get FREE Information (800) 447-0018

Software
Terminal Emulation ...... ext. 518
Year 2000 .... ext. 519

Computers/Peripherals
Cabinets/Racks/
Desktop PCs .... ext. 201
Furniture .... ext. 220
Mainframes .... ext. 215
Midrange .... ext. 219
New/Used Equipment .... ext. 223
Security .... ext. 218
Workstations .... ext. 203

Networking/Communications
Internet Products/
Services .... ext. 634
Network Hardware ...... ext. 619
Network Software ...... ext. 618
Networking/Communications
TCP/IP Applications .... ext. 626
Security .... ext. 632
Storage/Cabinets/
LAN Racks .... ext. 615

Services
MS SQL Server Client/Server
Development .... ext. 711
Year 2000 .... ext. 710

Internet/Intranet
Consulting .... ext. 308
Firewalls .... ext. 314
Security .... ext. 322

Marketplace Vendor Center

A FREE SERVICE for our readers that's as easy as...

① Call the Computerworld Marketplace Vendor Center at (800) 447-0018.

② Ask for the extension listed in the product area you want information on.

③ Sit back and relax - your requested information is on the way.

COMPUTERWORLD

Distinct NFS 95

Easiest way to Share Files, Programs and Printers

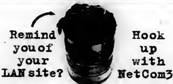
Highlights:

- Integrates seamlessly into Windows 95
- Mounts NFS drives from Explorer or Network Neighborhood
- Supports file and record locking
- Allows central authentication with a single server running PCNFSD for all NFS connectivity
- Prints to NFS or LPD print servers
- Allows login to all systems with a single login name and password or different login names for each system
- Allows single-operation logout of all systems accessed through Network Neighborhood
- Fine tunes performance parameters for each server you access

Free Evaluation Copy Available at...

distinct

408.366.8933
http://www.distinct.com
Fax: 408.366.0153
E-mail: cworld@distinct.com
Fastfacts: 408.366.2101



Over 2,500 LAN users have chosen NetCom3 to organize their networks and maximize productivity. Call today for a FREE sample disk and full color brochure. And ask about our 48-Hour Quick Ship Program!
1(800)4321-EDP ext. 368

48 HR QUIK SHIP

800 4321 EDP ext 368

2550 West Midway Blvd
Broomfield CO 80020
(303)465-2800

NetCom3

ALICOMP

Which has serviced over 175 diverse clients, specializes in providing VM, MVS, VSE service to clients who need:

- •OUTSOURCING
- •REMOTE COMPUTING
- •YEAR 2000: Mainframe Conversion Test Environment
- •TAPE CONVERSIONS
- •SYSTEMS INTEGRATION CONSULTING

[illegible]

We are the "Boutique" of the Computer Services World

(201) 319-8787 • (800) 274-5556

Sales & Rentals

- ✓ Processors
- ✓ Peripherals
- ✓ Upgrades
- ✓ New
- ✓ Reconditioned with warranty

http://www.dempseybus.com
e-mail: dempseybus@dempseybus.com

Dempsey BUSINESS SYSTEMS
2136 Michelson Drive · Irvine, CA 92612-1304
Phone: (714) 475-2900 Fax: (714) 475-2929

Buy • Sell • Rent (800) 888-2000

EDITORIAL REPRINTS

Reprints of editorial articles from Computerworld provide a valuable marketing/sales tool for your company!

For information on ordering reprints contact:
Sharon Bryant
Computerworld Reprints Department
Tel: (508)820-8125 Fax: (508)875-0733
Email: sharon_bryant@cw.com

COMPUTERWORLD
The Newspaper for Information Technology Leaders

Is Your Organization Ready for the Year 2000?

We offer:

- ◆ Full Conversion Strategy
- ◆ Assessment/Planning
- ◆ Supervision/Conversion/Testing
- ◆ Flat fee, low rates
- ◆ Off Site Development
- ◆ Automated Tools, Human Resources
- ◆ Specialized COBOL Technicians
- ◆ Previous Experience Year 2000 Conversions

You take care of your business, we'll take care of the conversion! Don't wait until 1999. Call us now for a FREE plan.

ISC Corp. Rye, New York
(800) 298-1336

COMPUTERWORLD, INC.

CEO/ President	Senior Vice President/ Finance	Vice President/ Human Resources	Executive Assistant to the CEO/President
Gary J. Beach	Matthew C. Smith	Susan C. Perry	Karen E. Elliott

COMPUTERWORLD

An IDG Company: The World's Leader in Information Services on Information Technology

Executive Vice President/Publisher
Michael R. Rogers
Computerworld Headquarters: 500 Old Connecticut Path, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 508-879-0700, FAX: 508-875-4394

Editor	Vice-President Marketing	Vice-President Consumer Marketing
Paul Gillin	Bob Winter	Gail Odeneal

PUBLISHER'S OFFICE: *Assistant to the Publisher*/Laureen Austermann **MARKETING:** *Director, Marketing Communications*/Mary Doyle, *Senior Manager, Marketing Communications*/Elizabeth Phillips, Manager, *Trade Show & Conventions*/Audrey Abbott, *Marketing Manager*/Susan Thaxter, *Marketing Communications Project Manager*/Karen Lesko, *Marketing Specialist*/Emily Dinneen, *Administrative Assistant*/Patty White **CIRCULATION:** *Director of Circulation Management*/Maureen Burke **PRODUCTION:** *Production Director*/Christopher P. Cuoco, Production Manager/Beverly Wolff **SALES PROFESSIONAL DEVELOPMENT:** Operations Director/Cynthia Delany **DISTRIBUTION:** Distribution Manager/Bob Wescott, Traffic Manager/Pat Walker **INFORMATION SYSTEMS:** Vice-President of IS/Walter Crosby

SALES OFFICES

Computerworld Headquarters: 500 Old Connecticut Path, P.O. Box 9171 Framingham, MA 01701-9171
Phone: 508-879-0700, FAX: 508-879-0446

NORTHEAST

Regional Vice President: Sherry Driscoll, Senior District Manager: John Watts, District Managers: Isabelle Kane, Laurie Marinone, Sales Office Coordinator: Tammy Boisvert, Sales Associate: Karen Beasley, Sales Assistants: Cheryl Stratton, Diane McNeil, 470 Totten Pond Rd., 5th Floor, Waltham, MA 02154 (508) 879-0700 FAX: (617) 890-2669 Hearing Impaired: (800) 428-8244

NEW YORK & NEW JERSEY

Regional Vice President: James Hussey, Senior District Managers: Fred LoSapio, Victoria Gonin, Barry Cheney, Senior Account Executive: John Bosse, Sales & Office Associate: Susan Kusnic, Sales Associate: Valerie Luscziak, Sales Assistants: Jean Dellarobba, John Radzniak, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090 FAX: (201) 587-9255, (201) 587-1289 Hearing Impaired: (800) 208-0088

SOUTH-ATLANTIC

Regional Vice President: Bernie Hockswender, Sales Administrator: Jennifer Pattemaude, 1965 Woodington Circle Suite 201, Lawrenceville, GA 30244 (770) 931-8124 FAX: (770) 931-8106 Hearing Impaired: (800) 449-4974, Senior District Manager Mike Bachman, Sales Assistant: Mary Cavaliere, 175 Strafford Ave. #1, Wayne, PA 19087 (610) 975-4581 FAX: (610) 975-4582

MIDWEST

Senior District Manager: Sharon R. O'Brien, Account Executive: Laurie Gomes, Sales Assistant: Denise Richards, 875 N Michigan Avenue, Suite 2846, Chicago, IL 60611 (312) 943-4266 FAX: (312) 943-2214

SOUTHWEST

Sales Assistant: Brenda Shipman, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (972) 233-0882 FAX: (972) 701-9008 Hearing Impaired: (800) 822-4918

NORTHERN CALIFORNIA

Vice-President Western Advertising Sales: Richard Espinoza Senior District Managers: Ernie Chamberlain, Linda Holbrook Dusay, Christine Curry, District Managers: Lisa Kowalski Denyce Kehoe, HR Representative: Leticia Lehane, Operations Manager: Denise Hui, Account Executives: Shannon Dempsey, Andrea Zurek, Gena Haas, Sales Associates: Tamara Haney, Emmie Hung, Amy Blechman, Todd Herrold, Nina Pukonen, Bonnie Robson, Larisa Gagainis, Office Services: Jessica Abude, Sales Coordinators: Yvonne Zuniga, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312 Hearing Impaired: (800) 900-3179

SOUTHERN CALIFORNIA

District Manager: Nancy Coy-Bianchi, Account Executive: Susan Davis, Sales Associate: Pat Duhl, 2171 Campus Drive, Suite 100, Irvine, CA 92612 (714) 250-3942 FAX: (714) 476-8724

ADVERTISING OPERATIONS

Display Advertising Production Manager: Paula Wright, Display Advertising Coordinators: Lisa Tanner, Gregg Pinsky, (508) 879-0700 FAX: (508) 879-0446

CUSTOM PUBLICATIONS

Boston: Director of Publishing Services/Carolyn Medeiros, Project Coordinator/Heidi Broadley, Managing Editor/Peter Bochner, Graphic Designer/Gail Varney, 500 Old Connecticut Path, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 875-6310

San Francisco: Vice President Custom Publications/Elaine R. Offenbach, Sales Associate/Nikki Wilson, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312

COMPUTERWORLD JOURNALS

Director: James Hussey, 500 Old Connecticut Path, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 872-2564

Manager: Don Calamaro, 1856 Windsor Park Lane, Havertown, PA 19083 (610) 446-5372 FAX: (610) 446-5753
Display Advertising Coordinator: Peggy Hennessey, 500 Old Connecticut Path, Box 9171, Framingham, MA 01701-9171 (508) 879-0700 FAX: (508) 879-0446

MARKETPLACE ADVERTISING

Sales Manager/Michelle Reeves, Sales Assistant/Nancy Whittaker, 500 Old Connecticut Path, Framingham, MA 01701-9171 (800) 343-6474 FAX: (508) 820-0941

Western Account Executive/Claude Carbonno, 500 Airport Blvd., Suite 400, Burlingame, CA 94010 (415) 548-5544 FAX: (415) 343-3003

COMPUTERWORLD INFORMATION MANAGEMENT DIVISION

Vice President/General Manager: Richard Mikita, Vice President: John Carpenter

Computerworld VAR Database: Carol Mullen/ National Sales Manager, Account Executive/Sean Weglage, (508) 879-0700 FAX: (508) 879-0184

Computerworld Buyers Database East: Regional Manager, Database Services/Linda Clinton, (508) 879-0700 FAX: (508) 879-0184

Computerworld Buyers Database West: (415) 347-0555 FAX (415) 347-8312

RECRUITMENT ADVERTISING SALES OFFICES

Vice President/Recruitment Advertising/John Corrigan Marketing Director/Derek E. Hulitzky, Sales Development Manager/Jay Savell, 500 Old Connecticut Path, Framingham, MA 01701-9171 (800) 343-6474

New England & Upstate New York: Regional Manager/Nancy Percival, 470 Totten Pond Rd., 5th Floor, Waltham, MA 02254 (800) 343-6474, Account Executive/Nancy Mack, (800) 343-6474

Mid-Atlantic: Regional Manager/Marty Finn, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090, Account Executive/Caryn Dlott, (800) 343-6474 TDD: (800) 208-0088

South-Atlantic: Regional Manager/Katie Kress-Taplett, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sales Manager/Pauline Smith (800) 343-6474

Midwest: Regional Manager/Pat Powers, 1011 East Touhy Avenue, Suite 550, Des Plaines, IL 60018 (847) 827-4433, Account Executive/Nick Burke (800) 343-6474 TDD: (800) 227-9437

Southwest: Regional Manager/Ellen Cross, 14651 Dallas Parkway, Ste 304, Dallas, TX 75240 (972) 726-7485, Account Executive/Jim Parker, (800) 343-6474

Northwest: Regional Manager/Christopher Glenn, 246 Casitas Ave., San Francisco, CA 94127 (415) 665-2443, Account Executive/Fabiola Frantz, (800) 343-6474

West: Regional Manager/Barbara Murphy, 2171 Campus Drive, Ste 100, Irvine, CA 92715 (714) 250-0164, Account Executive/Jeff Yoke (800) 343-6474 TDD: (800) 203-5867

Internet Careers Site: Jennifer Anspe, Sales Associate, 500 Old Connecticut Path, Framingham, MA 01701-9171 (800) 343-6474

DIRECT RESPONSE CARDS

500 Old Connecticut Path, Framingham, MA 01701-9171 (800) 343-6474

National Accounts Director/Norma Tamburrino, Account Executive/Christine McGovern, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

ALLIANCE MARKETING

Director/Elizabeth Cooper, Sales Associate/Nancy Dillon, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555 FAX: (415) 347-8312

INTERNATIONAL DATA GROUP

Chairman of the Board, Patrick J. McGovern; **President,** Kelly Conlin; **Chief Operating Officer:** Jim Casella

Computerworld is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 275 computer publications in over 75 countries. Sixty million people read one or more International Data Group publications each month.

ADVERTISERS INDEX

ADP 15
http://www.adp.com
Amdahl 75
http://www.amdahl.com
Cayenne Software Inc. C3
http://www.cayennesoft.com
BMC Software 64
http://www.bmc.com
Compaq Computer Corp. 34-35
http://www.compaq.com
Computer Associates 5, 18-19, 56
http://www.cai.com
Compuware 25
http://www.compuware.com
Data General 49
http://www.dg.com
Digital Equipment Corp. 11, 22-23
http://www.digital.com
Forté C4
http://www.forte.com
Fujitsu 13
Hewlett-Packard 52-53
http://www.hp.com
IBM 59
http://www.ibm.com
Informix Software 37
http://www.informix.com
Innovation Data Processing 9
http://www.innovationdp.fdr.com
Internet Commerce Expo 78
Lawson Software 45
http://www.lawson.com
(800) 477-1357
McAfee 46
http://www.mcafee.com
Micron 38
http://www.micron.com
Microsoft 104
http://www.microsoft.com
NCR 29
http://www.ncr.com
(800) CALL-NCR 13000
NEC Technologies 54-55
http://www.nec.com
Nokia Display Products 39
http://www.nokia.inttech.com
(800) BYNOKIA
Open Text 50
http://www.opentext.com
Oracle Corp. 7
http://www.oracle.com
SAS Institute 61, 72
http://www.sas.com
SCO 42
http://www.sco.com
State Of The Art 102
http://www.sota.com
Sun Microsystems 21
http://www.sun.com
System Software Associates 100
Tech Corps 17
Tivoli Systems 71
http://www.tivoli.com
Toshiba 26-27
http://www.toshiba.com
Unisys 30-31
http://www.unisys.com
(800) 874-8647 X100
Vanstar 98
http://www.vanstar.com
Vision Solutions 69
http://www.visionsolutions.com
Workstation Group 40
http://www.wrkgrp.com

To have your Internet address listed here, please contact Paula Wright at (508) [illegible]-7716
This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

HAVE A PROBLEM WITH YOUR COMPUTERWORLD SUBSCRIPTION?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:
COMPUTERWORLD, P.O. Box 2043, Marion, Ohio 43305-2043.
Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Address Changes or Other Changes to Your Subscription
All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line.

Your New Address Goes Here Address shown: ☐ Home ☐ Business

Name
Company
Address
City State Zip

Name
Title
Company
Address
City
State
Zip

Other Questions and Problems
It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available: 1-800-669-1002 Outside U.S. call (614) 382-3322). Internet address: circulation@cw.com

COMPUTERWORLD allows advertisers and other companies to use its mailing list for selected offers we feel would be of interest to you. We screen these offers carefully. If you do not want to remain on the promotion list please write to the following address – COMPUTERWORLD, Circulation Department, 500 Old Connecticut Path, Framingham, MA 01701

The Week in Stocks

Gainers

P E R C E N T

Retix	26.3
SQA Inc.	21.9
Dataware Technologies Inc.	12.2
Sequoia Systems Inc.	11.8
Micro Touch Systems Inc.	11.6
Lycos Inc.	10.4
Planet Corp.	9.8
Exabyte	9.3

D O L L A R

SQA Inc.	4.25
Micro Touch Systems Inc.	2.75
Sun Microsystems Inc.	2.38
Reynolds and Reynolds	2.13
Boole and Babbage(H)	2.00
Paychex	2.00
Quantum Corp.(H)	1.94
BMC Software Inc.	1.88

INDUSTRY ALMANAC

Big iron at your service

Several companies in the large systems sector of Computerworld's Stock Ticker are hinging much of their profits on their services offerings.

Forget hardware — companies such as Amdahl Corp. (NYSE:AMH) and Digital Equipment Corp. (NYSE:DEC) already rely on services for at least half their earnings, based on recent results. And even IBM's (NYSE:IBM) services business makes up 20% of total earnings.

In fact, IBM hired 15,000 service personnel last year and will hire another 15,000 this year. John Jones, an analyst at Salomon Brothers, Inc. in San Francisco, predicts that IBM's services business will earn $22 billion in 1998 and that it will make up 25% of all IBM revenue.

Jones said his buy rating on IBM shares is based mostly on IBM's nonhardware business.

And at the recent Lotusphere conference in Orlando, Fla., IBM Chairman Louis V. Gerstner hinted at even more service investment in IBM's subsidiary Lotus Development Corp. It seems users are suffering through poor Lotus support, and the Cambridge, Mass., firm is looking to IBM's experience to help it out.

Amdahl shares haven't seen the same interest from investors. Amdahl's restructuring of the company to be more service-oriented caused its recent lukewarm financial results, said officials at the Sunnyvale, Calif., firm.

But the services changes continue. Amdahl's DMR Consulting Group subsidiary last month bought Quadrant International Pty. Ltd., a systems integrator for airlines. Montreal-based DMR has also started a year 2000 consulting business.

In a reversal to this services trend, hardware is going strong for Data General Corp. (NYSE:DGN). The company once leaned on services for much of its revenue, but recently almost 90% of its gains were due to its Clariion and Aviion product lines. Shares in the Westboro, Mass., firm have doubled in value from about $9 last year to about $18 today.

— Tim Ouellette

BIG IRON SERVES YOU

	1/10	1/17	1/24	1/31	2/6
IBM	162 ⅞	[illegible]	149 ½	[illegible]	146
Stratus	26 ⅞	[illegible]	30 ⅝	[illegible]	32 ½
Amdahl	11 ⅞	[illegible]	11 ⅝	[illegible]	11

Exch	52-Week Range			Feb. 7 2 pm	Wk Net Change	Wk Pct Change
COMS	81.63	33.50	3COM Corp	48.88	16.75	-27.9
AIT	80.88	49.63	AMERITECH Corp	39.00	0.00	0.0
T	40.38	31.88	AT&T	38.00	1.00	-2.5
ASND	80.25	38.50	Ascend Communications	66.38	-4.38	-6.0
BNYN	10.75	3.25	Banyan Systems Inc.	4.13	-0.25	5.6
BAY	49.00	28.13	Bay Networks Inc.	30.13	-2.75	-12.6
BEL	80.38	45.50	Bell Atlantic Corp	67.88	1.38	2.1
BLS	45.50	33.25	BellSouth Corp	43.38	1.38	-2.3
BRKT	42.25	13.00	Brooktrout Technology	28.75	-1.25	-4.8
CS	43.63	26.50	Cabletron Systems	36.63	-4.25	-12.2
CSCC	91.25	36.50	Cascade Communications	80.38	-2.38	-3.7
CCRN	24.13	11.63	Centigram Communications	13.88	-0.38	-2.8
CSCO	75.75	40.00	Cisco Systems Inc.	60.00	-7.00	-10.6
CLIK	9.25	3.25	Compression Labs Inc. (L)	3.25	-0.38	-4.8
CMNT	10.00	4.25	Computer Network Tech.	3.88	-0.88	-15.1
XCOM	12.75	4.75	CrossComm	2.38	0.38	0.0
DIGI	28.50	12.63	DSC Communications	22.75	-0.38	-1.7
FORE	44.75	23.50	FORE Systems Inc.	29.38	0.25	0.9
GDC	10.88	9.13	General DataComm Inds	9.00	1.00	-9.0
GSX	38.50	14.25	General Signal Networks	44.00	-0.63	-1.4
GTE	49.25	37.75	GTE Corp	47.38	0.00	0.0
LU	37.25	29.75	Lucent Tech	54.88	-1.00	-2.8
MADGF	46.63	8.13	Madge Networks NV	13.75	1.00	-6.8
MCIC	37.50	22.38	MCI Communications Corp (H)	38.38	1.00	4.5
MNPI	34.50	3.88	Microcom Inc.	13.88	-0.25	-3.9
NETM	18.88	4.81	NetManage Inc.	4.88	-0.38	-7.3
NTRX	36.88	3.75	Netrix Corp	3.13	0.13	2.6
NCDI	16.75	2.00	Network Computing Devices (H)	14.75	-0.88	-4.1
NWK	36.00	11.13	Network Equipment Tech	18.75	-1.00	-4.8
NETG	80.25	13.25	Network General	27.81	-0.69	-2.4
NN	37.25	20.38	Newbridge Networks Corp	30.50	-2.63	-7.6
NT	59.88	44.63	Northern Telecom Ltd. (H)	80.38	-2.88	-3.4
NOVL	15.63	8.75	Novell Inc.	11.75	1.00	-7.8
NYN	50.25	42.00	Nynex Corp.	50.75	0.38	0.7
OCTL	31.75	13.50	Octel Communications Corp.	20.75	-1.13	-5.1
ODSI	29.00	11.25	Optical Data Systems Inc.	15.88	-0.38	-2.3
PAC	40.00	25.88	Pacific Telesis (H)	38.88	-0.38	-2.3
PCTL	44.72	17.00	PictureTel Corp (L)	18.88	1.13	6.3
PTON	7.50	3.88	Proteon Inc.	3.00	0.19	7.3
RACO	7.88	3.88	Racotek Inc.	4.38	0.06	0.0
RETX	10.88	1.88	Retix	3.88	1.00	25.3
SBC	60.25	48.38	SBC Communications	53.00	-0.75	-1.6
SFA	28.38	13.88	Scientific Atlanta Inc.	18.00	-0.25	-1.3
SHVA	97.25	16.50	Shiva Corp (L)	20.88	-1.75	-6.6
FON	43.38	34.50	Sprint Corp	41.88	0.88	2.1
SMSC	18.75	3.88	Standard Microsystems Corp	8.00	-0.13	-1.6
USRX	105.50	43.50	US Robotics	48.38	-1.88	-2.4
USW	37.50	27.25	U S West Inc.	33.13	-0.50	-5.9
XIRC	31.13	9.63	Xircom	19.88	0.38	2.5
XYLN	70.00	30.25	Xylan Corp (L)	30.75	-8.88	-22.4

Exch	52-Week Range			Feb. 7 2 pm	Wk Net Change	Wk Pct Change
AALR	13.25	8.13	Advanced Logic Research	8.13	-0.75	-8.9
AAPL	30.25	15.13	Apple Computer Inc. (L)	16.00	-0.63	-3.8
ASTA	8.88	3.94	AST Research Inc	4.75	-0.25	-5.0
CPQ	81.50	35.88	Compaq Computer Corp (H)	81.25	-5.88	-6.7
DELL	72.38	13.75	Dell Computer Corp	64.00	-2.38	-3.5
GATE	86.25	23.38	Gateway 2000 Inc.	59.13	-2.13	-3.5
HWP	57.75	37.75	Hewlett Packard Co.	51.38	-2.38	-4.4
MUEI	39.88	8.75	Micron Electronics Inc.	20.88	-1.88	-8.0
NIPNY	65.00	38.50	NEC America	58.38	-2.75	-4.8
SGI	30.38	17.88	Silicon Graphics	25.88	-2.00	-7.3
SUNW	35.13	20.38	Sun Microsystems Inc.	35.81	2.38	6.9

Exch	52-Week Range			Feb. 7 2 pm	Wk Net Change	Wk Pct Change
AMH	14.88	7.50	Amdahl Corp	10.88	-0.75	-6.5
DGN	18.13	8.00	Data General Corp	18.00	-0.75	-4.0
DEC	38.00	28.38	Digital Equipment Corp	35.13	-2.63	7.0
IBM	170.13	38.13	IBM	147.38	-10.00	-6.8
MDCD	20.25	8.88	Meridian Data Inc.	4.63	-2.00	-30.2
NETF	6.13	2.23	NetFrame	3.00	-0.44	-14.9
SQNT	80.13	10.73	Sequent Computer Sys.	17.88	0.13	0.3
SEQS	5.13	1.88	Sequoia Systems Inc.	2.38	0.25	11.8
SRA	32.88	15.88	Stratus Computer Inc (H)	33.75	1.38	4.4
TDM	15.25	8.88	Tandem Computers Inc	13.88	-0.63	-4.5
UIS	8.13	5.88	Unisys Corp.	6.75	-0.13	-1.8

Exch	52-Week Range			Feb. 7 2 pm	Wk Net Change	Wk Pct Change
ADBE	48.13	28.50	Adobe Systems Inc.	38.25	-1.25	-3.3
AMSWA	7.81	3.63	American Software Inc.	7.16	0.25	3.5
APLX	62.50	33.00	Applix Inc	75.00	-0.38	-13.7
ARSW	82.75	21.00	Arbor Software	37.00	-0.38	-4.8
ADSK	44.25	38.00	Autodesk Inc	38.00	-1.13	-3.8
BGSS	31.75	10.88	BGS Systems Inc	27.75	-1.75	-5.9
BMCS	81.00	25.50	BMC Software Inc.	38.50	1.88	4.4
BOOL	27.50	14.00	Boole and Babbage (H)	27.00	2.00	8.0
BORL	31.25	4.75	Borland Int'l Inc.	6.44	0.06	1.0
BOBJY	33.00	8.63	Business Objects	13.00	-1.25	-8.7
CAYN	11.88	3.81	Cayenne Software Inc.	3.25	-0.13	-3.7
CNTR	6.75	2.63	Centura Software	4.44	-0.44	-9.0
COGNF	39.50	15.00	Cognos Inc.	32.63	3.25	10.9
CA	67.88	37.33	Computer Associates	47.63	1.38	3.5
CVN	15.75	5.75	Computervision Corp	7.13	-0.38	-5.0
CPWR	69.25	18.00	Compuware Corp (H)	68.13	-3.88	-4.8
CSRE	32.00	10.75	Comshare Inc.	14.88	0.00	0.0
COSFF	13.88	3.88	Corel Corp (L)	3.88	0.13	3.9
DWTI	9.25	2.62	Dataware Technologies Inc.	3.75	0.40	12.2
FILE	67.00	18.38	FileNet Corp	38.75	1.88	5.0
FRTE	92.75	28.75	Forte Software	30.00	-1.38	-4.8
FTPS	15.88	4.88	FTP Software Inc.	7.00	-0.75	-9.7
HUMCF	47.63	23.00	Hummingbird Comm. Ltd.	31.25	-1.38	-4.2
HYSW	36.00	8.75	Hyperion Software Corp	22.63	-1.38	-5.7
IRIC	15.88	11.00	Information Resources	15.38	-0.38	-2.4
IFMX	36.75	11.88	Informix Corp	20.75	-1.88	-7.5
INGR	20.38	7.75	Intergraph Corp (L)	8.00	-0.13	-1.5
LEAF	10.25	1.81	Interleaf Inc	2.00	-0.31	-13.5
ISLI	13.88	7.50	Intersolv Inc.	8.00	-0.38	-4.8
INTU	69.50	25.88	Intuit Inc. (L)	27.13	-2.00	-6.9
TLC	38.31	20.88	Learning Co. (The) (L)	10.88	-2.25	-17.5
LGWX	22.25	3.25	Logic Works	7.13	-0.88	-10.9
MAPS	10.00	7.00	MapInfo Corp	9.00	0.38	3.9
MATH	3.25	1.75	MathSoft	4.19	0.00	4.7
MCAF	83.00	20.38	McAfee Associates	37.38	-1.75	-4.5
MENT	13.88	7.88	Mentor Graphics	9.88	-0.38	-3.8
MIFGY	21.25	3.88	Micro Focus	16.38	-0.63	-3.7
MCXI	18.63	4.75	Micrografx Inc.	4.75	-0.25	-5.0
MSFT	101.00	40.38	Microsoft Corp (H)	98.63	-3.63	-3.6
ORCL	31.00	30.50	Oracle Corp	38.88	-0.25	-0.6
PMTC	64.25	31.50	Parametric Technology	57.88	0.00	0.0
PARQ	14.88	1.63	ParcPlace Systems Inc. (L)	1.75	-0.25	-12.2
PSFT	56.75	23.38	PeopleSoft	48.88	-5.13	-10.0
PTEC	28.88	12.50	Phoenix Technologies	13.88	0.38	3.2
PSQL	13.75	3.13	Platinum Software	8.88	-0.50	-5.9
PLAT	18.75	9.25	Platinum Technology	15.88	-2.38	-4.0
PRGS	29.50	12.13	Progress Software Corp	17.00	-0.13	-0.7
RNBO	24.25	14.63	Rainbow Technologies Inc.	18.13	-0.25	-1.4

Exch	52-Week Range			Feb. 7 2 pm	Wk Net Change	Wk Pct Change
REDB	61.88	17.17	Red Brick Systems Inc.	19.88	-0.88	-3.7
SAPE	58.25	30.38	Sapient Corp.	40.63	-0.75	-1.8
SCOC	9.13	5.00	SCO Inc.	7.13	-0.63	-8.1
SDTI	54.88	22.88	Security Dynamics Tech.	31.25	-3.88	-10.1
SQAI	30.75	17.63	SQA Inc.	23.63	4.25	21.9
SOTA	14.75	9.88	State of the Art	12.81	-0.94	-6.8
SSW	30.88	27.25	Sterling Software Inc. (L)	27.75	-1.88	-6.1
SDRC	37.88	13.00	Structural Dynamics Research	25.38	0.00	0.0
SYBS	38.13	13.88	Sybase Inc.	17.75	0.38	2.0
SYMC	18.38	3.75	Symantec Corp.	16.50	0.38	2.0
SNPS	50.50	39.88	Synopsys	38.88	-2.88	-6.9
SSAX	26.75	8.88	System Software Assoc.	10.13	0.00	0.0
SYSF	30.88	5.38	SystemSoft Corp.	10.13	-0.75	-6.4
TRUV	8.88	2.44	Truevision Corp.	3.88	-0.69	-14.8
VIEW	17.00	8.38	ViewLogic Systems	10.81	0.19	1.6
VMRK	17.83	3.50	Vmark Software Inc.	6.88	0.13	1.9
WALK	13.88	6.38	Walker Interactive Systems	12.75	-0.06	-0.5
WALL	27.00	12.25	Wall Data Inc.	17.38	-2.25	-11.7
WANG	28.13	19.38	Wang Laboratories Inc.	22.25	-1.88	-8.3

Exch	52-Week Range			Feb. 7 2 pm	Wk Net Change	Wk Pct Change
AOL	71.88	22.38	America On-Line	36.00	-1.75	-4.6
BBN	38.75	15.63	BBN Corp	23.25	-0.75	-3.1
CSRV	38.00	6.88	CompuServe Corp.	10.00	-0.25	-2.5
EDFY	38.75	11.00	Edify Corp (L)	13.88	1.25	10.1
LCOS	39.25	9.75	Lycos Inc.	18.00	1.75	10.6
NETC	44.50	10.25	Netcom On-Line	12.63	-1.13	-8.2
NSCP	75.38	34.00	Netscape Comm. Corp	50.88	-1.25	-2.4
OMKT	63.25	21.88	Open Market Inc.	13.13	-2.13	-13.9
PSIX	88.38	8.75	PSINet	10.00	0.38	3.9
QDEK	38.88	3.94	Quarterdeck Corp	4.38	-0.88	-15.5
RAPT	38.25	12.75	Raptor Systems	18.00	-1.13	-5.9
SCUR	38.25	9.88	Secure Computing Corp.	7.38	0.13	1.7
SPYG	30.88	20.88	Spyglass Inc.	11.75	-0.75	-6.0
YHOO	45.38	15.88	Yahoo! Inc.	20.63	1.88	11.3

Exch	52-Week Range			Feb. 7 2 pm	Wk Net Change	Wk Pct Change
AMD	28.13	10.25	Advanced Micro Devices (H)	34.25	1.13	3.2
ADI	30.38	17.75	Analog Devices Inc. (H)	37.00	-1.88	-5.0
CHPS	26.50	8.13	Chips and Technologies	13.25	-0.63	-4.5
CRUS	27.38	17.63	Cirrus Logic	15.75	0.19	1.2
CY	16.88	9.13	Cypress Semiconductor Corp	12.13	-0.50	-4.0
CYRX	36.50	11.88	Cyrix	25.00	-0.63	-2.4
INTC	165.00	51.88	Intel Corp (H)	155.13	-8.25	-5.0
LSI	36.50	17.00	LSI Logic Corp	33.75	-1.25	-3.6
LSCC	38.88	18.75	Lattice Semiconductor	50.88	-2.00	-3.8
MCRL	48.88	12.88	Micrel Semiconductor Inc.	38.13	-1.88	-4.9
MU	80.38	16.63	Micron Technology	35.75	-1.75	-4.8
MOT	68.75	44.13	Motorola Inc.	59.75	-2.25	-3.7
NSM	27.75	13.88	National Semiconductor (H)	26.00	-3.25	-11.8
TXN	80.38	38.38	Texas Instruments (H)	70.00	0.00	0.0
VLSI	35.88	10.38	VLSI Technology	16.63	0.06	0.4
XLNX	48.13	28.50	Xilinx	45.75	0.00	0.0
ZLG	38.38	14.88	Zilog Inc	24.63	-2.38	-8.8

Exch	52-Week Range			Feb. 7 2 pm	Wk Net Change	Wk Pct Change
APCC	31.38	8.88	American Power Conversion	25.88	1.50	3.8
ADPT	48.38	20.50	Adaptec Inc.	39.88	-0.38	-0.9
CBEX	7.88	1.31	Cambex Corp (L)	1.31	-0.31	-19.2
CREAF	35.13	3.88	Creative Technology Ltd. (H)	12.50	1.25	11.1
RACE	24.50	3.75	Data Race Inc.	8.88	-0.63	-6.7
DTM	12.50	4.13	Dataram Corp (H)	10.25	-0.88	-7.9
EMC	38.88	16.50	EMC Corp	33.88	-0.75	-2.0
EMLX	21.88	9.88	Emulex Corp	13.63	-1.88	-12.4
ESCC	39.00	20.88	Evans and Sutherland	20.50	-1.75	-7.9
EXBT	22.75	9.38	Exabyte	11.75	1.00	9.3
[illegible]	4.13	1.38	Intelligent Systems	2.00	-0.06	-3.0
IOM	58.13	6.88	Iomega Corp	17.88	-0.38	-2.3
IPLS	8.63	1.05	IPL Systems Inc.	3.88	0.13	3.2
KMAG	39.00	17.63	Komag Inc.	28.00	1.50	5.7
MTSI	39.75	12.00	Micro Touch Systems Inc.	30.88	2.75	11.6
PEAK	27.00	10.13	Peak Technology Group	13.75	0.50	4.4
PNCL	14.19	3.38	Pinnacle Micro Inc.	4.88	-0.25	-4.9
AQM	4.75	3.75	QMS Inc.	3.63	0.00	0.0
QNTM	41.88	16.88	Quantum Corp (H)	40.44	1.94	5.0
RDUS	4.88	0.34	Radius Inc.	0.88	-0.13	-14.2
SEG	52.38	18.75	Seagate Technology (H)	48.38	-2.38	-4.8
STK	54.38	34.38	Storage Technology	46.63	-2.38	-4.8
STLC	8.75	0.83	StreamLogic Corp	0.88	-0.06	-6.8
TEK	53.25	30.75	Tektronix Inc.	49.00	-0.63	-1.3
WDC	75.88	17.13	Western Digital Corp	68.88	-3.63	-5.0
XRX	61.13	40.88	Xerox Corp	54.38	-2.38	-4.8

Exch	52-Week Range			Feb. 7 2 pm	Wk Net Change	Wk Pct Change
AMSY	37.13	20.88	American Mgmt. Systems	31.75	0.50	1.7
ANLY	30.38	14.88	Analysts Int'l	28.38	-0.63	-2.1
AUD	41.75	35.63	Auto Data Processing	41.38	-0.25	-0.6
BDMI	61.38	20.88	BDM International Inc.	46.25	-7.75	-14.4
CATP	37.25	14.75	Cambridge Tech. Partners	29.75	0.25	0.8
CEN	54.38	32.38	Ceridian Corp	36.75	-0.75	-2.0
CDO	31.88	20.88	Comdisco Inc.	30.88	-0.38	-1.2
CHRZ	54.88	25.88	Computer Horizons	52.63	0.63	1.3
CSC	88.88	64.13	Computer Sciences	67.88	-0.63	-0.9
TSK	47.38	17.88	Computer Task Group	40.38	0.63	1.6
CPU	30.88	9.25	CompUSA Inc.	19.63	-1.13	-5.4
CDAT	28.63	12.75	Control Data Systems Inc.	15.88	-1.13	-6.6
EGGS	15.88	4.38	Egghead Discount Software	6.00	-1.06	-15.3
EDS	63.88	40.75	Electronic Data Systems Corp.	47.88	1.63	3.5
INAC	80.63	38.63	Inacom Corp	36.00	0.00	0.0
INEL	11.88	3.38	Intelligent Electronics	4.31	0.00	0.0
KEA	34.88	11.38	Keane Inc	23.00	0.75	3.4
MICA	35.50	9.00	MicroAge Inc.	13.00	-2.00	-13.3
PAYX	60.88	34.88	Paychex	49.75	2.00	4.2
PMS	55.50	33.13	Policy Management Sys.	45.38	3.25	7.8
REY	29.25	18.75	Reynolds and Reynolds	29.25	2.13	7.8
SCBI	30.88	14.44	SCB Computer Tech. Inc.	18.88	0.88	5.3
SEIC	26.38	13.75	SEI Corp	21.88	1.00	4.9
SMED	72.13	40.38	Shared Medical Systems	46.75	-0.88	-1.8
SSFE	63.50	18.88	Software Spectrum Inc.	23.88	-0.63	-2.7
VST	88.75	8.38	VanStar Corp	15.88	1.00	6.7
SNDT	38.88	31.88	SunGard Data Systems	39.88	-0.63	-1.6

KEY: (H) – New annual high reached in period (L) – New annual low reached in period

Copyright Nordby International Inc., Boulder, Colorado
This information is based on sources believed to be reliable, and while extensive efforts are made to assure its accuracy, no guarantees can be made. Nordby International and Computerworld assume no liability for any inaccuracies. For information on Nordby's customized financial research services, call (303) 938-1877.

Dist

rprise

Object 1
Object 2

How to contact Computerworld

TELEPHONE/FAX

Main phone number .... (508) 879-0700
All editors unless otherwise noted below
Main fax number .... (508) 875-8931
24-hour news tip line .... (508) 820-8555

E-MAIL

Our Web address is www.computerworld.com. All staff members can be reached via E-mail on the Internet using the form:
firstname_lastname@cw.com.
All IDG News Service correspondents can be reached using the form:
firstname_lastname@idg.com.

LETTERS TO THE EDITOR

Letters to the editor are welcome and should be sent to:
letters@cw.com
Please include your address and telephone number.

MAIL ADDRESS

PO Box 9171, 500 Old Connecticut Path,
Framingham, Mass. 01701

SUBSCRIPTION/BACK ISSUES

Phone .... (800) 669-1002
E-mail .... circulation@cw.com.
Back Issues .... (508) 820-8129

REPRINTS

Phone .... (508) 820-8125

CONTACTING CW EDITORS

We invite our readers to call or write with comments and ideas. It is best to submit ideas to one of the department editors as well as to the appropriate beat reporter.

Editor	Paul Gillin (508) 820-7724
Executive Editor	Maryfran Johnson (508) 820-8179

DEPARTMENT EDITORS/NEWS

News Editor	Patricia Keefe (508) 820-8183
Sections Editor	Kevin Fogarty (508) 820-8246
Assistant News Editor	Neal Weinberg (508) 820-8177
Assistant Sections Editor	Michael Goldberg (508) 820-7789
Online Editor	Johanna Ambrosio (508) 820-8553
Online News Editor	Judith H. Bernstein (516) 266-2863
Associate Editor, News	Mitch Betts (202) 347-6718

SENIOR EDITORS/NEWS

Groupware, E-mail, messaging	Barb Cole (619) 738-8858
LANs, operating systems	Laura DiDio (508) 820-8182
Network/systems management	Patrick Dryden (817) 924-5485
App development components	Sharon Gaudin (508) 820-8122
IS management	Thomas Hoffman (201) 587-0090
IS careers	Julia King (610) 532-7599
Investigative reports	Kim S. Nash (214) 716-9822
Apps, software suites	Lisa Picarille (415) 347-0555
Databases	Craig Stedman (508) 820-8120
Midrange hardware, Unix operating systems	Jaikumar Vijayan (508) 820-8220
Internet	Mitch Wagner (415) 548-5513
Internetworking	Bob Wallace (508) 820-8214

SENIOR WRITERS/NEWS

Mobile computing, social issues	Mindy Blodgett (508) 820-8168
PCs, servers, net computers	April Jacobs (508) 820-8121
Security, government	Sharon Machlis (508) 820-8231
Mainframes, high-end storage	Tim Ouellette (508) 820-8215

STAFF WRITERS/NEWS

@Computerworld	Stewart Deck (508) 820-8155
Telecommunications	Kim Girard (508) 820-8225
New products, multimedia, low-end storage	Matt Hamblen (508) 820-8567
Intranets	Justin Hibbard (415) 548-5525
@Computerworld	Patrick Thibodeau (508) 820-8143
Client/server software, Unix apps	Randy Weston (508) 628-4869
@Computerworld	Wylie Wong (415) 548-5581

OPINIONS/VIEWPOINT

Technical Editor	Charles Babcock (415) 548-5512
Columns Editor	Mitch Betts (202) 347-6718
Staff Columnist	Frank Hayes (503) 252-0100

DEPARTMENT EDITORS/FEATURES

Technology reviews/ Buyer's Guide	James Connolly (508) 820-8144

SENIOR EDITORS/FEATURES

Buyer's Guide	Cathleen Gagne (508) 820-7729
Careers	David B. Weldon (508) 820-8166
In Depth	Steve Ulfelder (508) 820-7745
Management	Robert L. Scheier (508) 628-4931
Managing	Allan E. Alter (508) 820-7714
Special reports	Gary H. Anthes (202) 347-0134

ASSOCIATE EDITORS/FEATURES

Managing	Rich Saia (508) 820-8118

IDG NEWS SERVICE CORRESPONDENTS

Paris bureau chief	Jeanette Borzo (33) 1-4904-8001
Munich correspondent	Torsten Busse (49) 89-811-6057
UK correspondent	Kristi Essick (44) 171-416-0701
Hong Kong bureau chief	Jon Skillings (852) 2535-4661
Tokyo correspondent	Rob Guth (81) 33 358-6122
Taipei correspondent	Terho Uimonen (88) 62-500-6523

RESEARCH

Bob Fink, senior research manager (508) 820-8116; Kevin Burden, senior researcher; Laura Hunt, research analyst; Amy Malloy, assistant researcher; Stefanie McCann, senior graphics coordinator; Mari Keefe, online researcher

COPY DESK

Ellen Fanning, managing editor (508) 820-8174; Roberta Fusaro, assistant managing editor; Christine Alcardi Maguire, Jamie Eckle, senior copy editors; Michelle Davidson, Kimberly Gifford, senior production copy editors; Pat Hyde, David Ramel, Jeremy Selwyn, Keith Shaw, copy editors; Scott Burnell, Monica Sambataro, online copy editors.

GRAPHIC DESIGN

Tom Monahan, design director (508) 820-8218; Janell Genovese, Mitchell J. Hayes, Nancy Kowal, senior graphic designers; Carol Lieb, photo researcher/editor; David Waugh, Mary Beth Welch, graphic designers; Rich Tennant, John Klossner, cartoonists.

ADMINISTRATIVE SUPPORT

Linda Gorgone, office manager (ext. 8176); Connie Brown (ext. 8178), Lorraine Witzell (ext. 8139); Rita Jones (ext. 8172), editorial assistants; Chris Flanagan, West Coast editorial assistant, (415) 548-5563.

COMPUTERWORLD MAGAZINES GROUP

(Includes Premier 100, Campus Edition, Best Places to Work, Leadership Series, Intranet Series, Electronic Commerce Journal and vertical industry journals.)
Alan Alper, editor (508) 820-8115; Mary Brandel, executive editor; Anne McCrory, Catherine McCrorey, Joyce Chutchian-Ferranti, managing editors; Kimberlee A. Smith, assistant managing editor and online coordinator; Stephanie Faucher, art director.

@COMPUTERWORLD

@Computerworld is our World Wide Web site. On it, we publish daily news and feature stories that supplement our print coverage. We also have special audio features, such as interviews with industry notables, and the @Computerworld Minute, which is an audio version of the day's top news.

A few times each week, we also have Links listings. These are resources related to online and/or print stories. We also have polls and forums that you must register for to access. The rest of the site is accessible without registering.
Contact: Johanna Ambrosio, Online Editor, (508) 820-8553 or johanna_ambrosio@cw.com.

Companies in this issue

Page number refers to page on which story begins. Company names can also be searched at www.computerworld.com.

3Com Corp. 8,10
A.C. Nielsen Co. 24
A.G. Edwards 88
Air France 20
Algorithmics, Inc. 57
Allstate Insurance Co. 47
American Century Investments 88
American Express Co. 105
American Red Cross 40
AMR Corp. 20
Andersen Consulting 80
Apple Computer, Inc. 28
AquaPenn Spring Water Co. 106
Aris Corp. 47
Artisoft, Inc. 43
AT&T Bell Labs 80
AT&T Corp. 1,4,8,51,105
AT&T Wireless Services, Inc. 9
Bain Capital 20
Banyan Systems, Inc. 28
Bay Area Council 58
Bay Networks, Inc. 10
Bell Atlantic Corp. 4
Bellcore 79
Bentley Corp. 57
BJC Corp. 88
Boole & Babbage, Inc. 10
Booz Allen & Hamilton, Inc. 51
Borland International, Inc. 16
Boundless Technology, Inc. 1
Boston City/Baptist
Hospital Medical Center 6
Brigham Young University 47
Bristol Technology, Inc. 60
British Telecommunications PLC 4
Business Objects, Inc. 6
CATS Software, Inc. 57
Candle Corp. 1
Canon Computer Systems, Inc. 57,96
Cap Gemini America 1
Career Vision, Inc. 6
Carolina Power & Light Co. 47
Castle Computer Corp. 14
Chase Manhattan Mortgage Co. 57
CheckPoint Software
Technologies Ltd. 1
CMH Corp. 51
Citibank 79
Citrix Systems, Inc. 1
Claris Corp. 28
Client/Server Labs, Inc. 73
Clipper Group, Inc. 10
Coats Viyella Group 39
Cognos, Inc. 6,43
Commercelink 24
Compaq Computer Corp. 39,47
CompUSA, Inc. 14
Computer Associates
International, Inc. 10,47,57,79
Computer Intelligence 96
Compuware Corp. 10
Concord Communications, Inc. 12
Connecticut Department
of Public Health 43
Consolidated Edison Co. 8
Corel Corp. 43
Cray Research, Inc. 6
Credit Suisse First
Boston Corp. 28
Crossroads Communications 51
Cylink Corp. 8
Data General Corp. 39
Datapro Information
Services Group, Inc. 6
Dataquest 43
Dell Computer Corp. 39
Deloitte & Touche 4
Dialogic Corp. 43
Digital Equipment Corp. 6,8,79,105
Dunlop Tire Corp. 6
Dunagate 1
Electronic Data Systems Corp. 57
Electronic Privacy
Information Center 105
Eli Lilly & Co. 1,12,24
EMC Corp. 14
Entergy Services, Inc. 43
Epson America, Inc. 96
Eurologic Systems 106
Executive Career Consultants, Inc. 88
Executive Directions, Inc. 57
Federal Communications
Commission 1
Federal Express Corp. 48
Finjan, Inc. 51
Fire Power Systems, Inc. 28
First Brands Corp. 43
First Health Services Corp. 4
Fleet Financial Group 105
FocusTech 8
Forrester Research, Inc. 1,8,14,47
Frontier Software Development, Inc. 18
Gartner Group, Inc. 1,8,105
Geac Computer Corp. 20
Georgia Tech Research Corp. 24
Giga Information Group 5,14,80,47
Global Marine Corp. 20
Gradient Technologies, Inc. 43
Great Western Financial Corp. 57
Haht Software, Inc. 51
Hajjar and Partners 106
Hallmark Cards, Inc. 3
Harris Corp. 51
Hasbro, Inc. 2
Heidrick & Struggles 1
Hewlett-Packard Co. 6,10
12,20,47,58,79,96
Hitachi Data Systems Corp. 14
Home Box Office 12
Huntington Bancshares Corp. 3
Hurwitz Group, Inc. 1,12,43,51
IBM 1,3,14,28,39,47,57,58,105
Indiana Power & Light Co. 8
Industri-Matematik
International Corp. 43,58
Infinity Financial Technology, Inc. 57
Information Resources, Inc. 43
Information Technology
Association of America 3
Infoseek Corp. 51,105
Intel Corp. 5,79,47
Internal Revenue Service 105
International Data Corp. 1,6,14
16,18,47,57,79
International Network Services, Inc. 12
Internet Business Network 1
JavaSoft, Inc. 51
John J. Davis Associates 57
Kenwick, Lewis & Brown, Inc. 8
Land O' Lakes, Inc. 96
Learn Heads 14
Lotus Development Co. 1,40
43,47,73,105
Louisiana State University 8
Lyra Research 96
Manugistics, Inc. 43
Market Advisory Services, Inc. 57
Marriott International, Inc. 57
Massachusetts Telecommunications
Council 4
MasterCard International, Inc. 80,88
McAfee Associates, Inc. 24
McDonald's Corp. 105
MCI Communications Corp. 4,51
Mercury Research, Inc. 3
Merrill Lynch & Co. 57
Meta Group, Inc. 20,28,43
Microsoft Corp. 1,6,9,14,20,28,43
47,51,73,80,105
Milkyway Networks Corp. 51
Millipore Corp. 39
Mitsubishi Electric Corp. 88
Nabisco, Inc. 1,6
National Association
of Security Dealers 3,20
National Computer
Security Association 79
NationsBank Corp. 14,47
NEC Technologies, Inc. 96
Netscape Communications Corp. 105
Network Solutions, Inc. 8
Network-1 Software &
Technology, Inc. 51
Next Software, Inc. 28
Novell, Inc. 3,66,105
NuTrend Technology-Canada, Inc. 1
Nynex Corp. 4
On Technology Corp. 77
Open Market, Inc. 79
Oppenheimer Wolff & Donnelly 60
Optimal Networks Corp. 43
Oracle Corp. 1,8,11,16,20,39
43,51,88,105
Pacific Bell 1
Palo Alto Management Group 39
Parker Hannifin Corp. 79
Pegasus Systems, Inc. 51
PeopleSoft, Inc. 51
Personal Computer
and Communications Association 14
Pinnacle Brands, Inc. 6
Planned Parenthood
of Western Washington 14
Plymouth Public School District 28
PNC Bank 57
Powersoft Corp. 80
Preview Travel, Inc. 51
Prime Cable of Las Vegas 10
Private Mortgage Insurance Co. 51
Raptor Systems, Inc. 51
Redsoft International LLC 47
Retired Persons Services, Inc. 47
Right Information Systems Ltd. 43
Risk Management Technologies 57
Robert Half International, Inc. 88
Rogue Wave Software, Inc. 43
Salve Decision Technologies 20
SAP AG 43
SAS Institute, Inc. 8
SBC Communications, Inc. 88
Seagate Software 6
Sears, Roebuck and Co. 1
Sentara Corp. 57
Sequent Computer Systems, Inc. 39
Silicon Graphics, Inc. 6,39
Simmons Co. 1
SKK, Inc. 79
Skyway Freight Systems, Inc. 6,20
Southwestern Bell Telephone Co. 88
Sprint Corp. 8,51
SRI Consulting 86
State of Texas 28
State University of New York 43
Sterling Software 10
Storage Technology Corp. 86
Summit Strategies, Inc. 6
Sun Microsystems, Inc. 1,6
20,39,43,79,105
Sybari Software, Inc. 79
Sybase, Inc. 3,20,41,86
Symantec Corp. 1
Synetix Corp. 51
Tele.Mac 105
TeleChoice, Inc. 51
The Bean Co. 43
The Carlson Group 48
The Clipper Group, Inc. 59
The Dow Chemical Co. 6
The Dun & Bradstreet Corp. 1,20
The Gap, Inc. 1
The Cuddy Group 86
The Madoff Co. 43
The Registry, Inc. 8
The Tower Group 57
Tivoli Systems, Inc. 10,57
TollPass Software Solutions 51
Trans World Airlines, Inc. 88
Transquest, Inc. 51
Trend Micro 77
Trusted Information
Systems, Inc. 8,51
TSW International 43
U.S. Commerce Department 8
U.S. Office of Management
and Budget 8
U.S. Social Security Administration 57
Unum, Inc. 1
Unisys Corp. 20,57
United Media 8
University of California 79
University of Pennsylvania 28
University of Vermont
School of Business Administration 8
Venus Data Security, Inc. 79
Venture Market Strategies 96
Versant Object Technology Corp. 20
Virtual Experiments 106
Virtual Technology Corp. 51
Visa International, Inc. 105
VLSI Technology, Inc. 57
Warren H. Soss Associates 14
WheelGroup Corp. 80
Wisconsin Electric Co. 1
Workgroup Strategic Services, Inc. 14
Wyse Technology, Inc. 1
Xacom Technology, Inc. 31
Xerox Corp. 57,96
Yamaichi International America 1
Yardstick 14
Zona Research, Inc. 14

Lots of accounting software
programs say they run on NT®/SQL Server.™

But only one is actually designed to.
Realizing The
Potential of
Client/Server
Accounting
Acuity
Accounts Payable

Anyone can say their accounting software package runs on NT/SQL Server. But that doesn't mean it'll deliver everything it should.

Introducing Acuity Financials™ — the one people are calling the industry's most powerful, flexible, scalable, full-featured accounting application going. And the only one built from the ground up solely with Microsoft's® latest tools and client/server technologies like VB® 4.0 and Component Object Model.

Which means that Acuity Financials is able to take unparalleled advantage of the power offered by SQL Server™ and Windows NT®.

So along with letting you get the most out of all Microsoft's products, tools and upgrades — and integrate all your applications under Windows® — Acuity Financials offers a remarkably fast installation time.

With Acuity Financials, you'll also get a highly-polished, user-friendly interface. Built-in Crystal Reports® and FRx®. A choice of preconfigured and fully-customizable financial management reports. And features that go far beyond what you'd expect — or find in any other product.

Like complete Internet and Intranet readiness, to let you take advantage of these emerging technologies. Full Year 2000 Compliance, so your new millennium is smooth sailing. Even several different price levels, to make sure your investment can grow with you.

Amazing, to be sure. But that's what you get with State Of The Art's 15-year heritage in designing award-winning accounting software. Not to mention the experience that went into developing our industry-leading MAS 90® accounting products.

Before you make any accounting software decision, run these numbers: 1-888-4ACUITY. Because when it comes to getting a platform designed specifically for today's NT/SQL Server, we're not just the best choice.

We're the only choice.

STATE OF THE ART
ACCOUNTING SOFTWARE
Strength in numbers.

www.sota.com. ©1997 State Of The Art, Inc. Acuity Financials, MAS 90, MAS 90 for Windows and State Of The Art, Inc. are trademarks or registered trademarks of State Of The Art, Inc. All other product names are trademarks of their respective companies.

IRS mulls outsourcing

CONTINUED FROM PAGE 1

candor about the extent of its computer problems in a congressional hearing two weeks ago.

"This is the first time we've gotten a clear indication from the IRS as to the extent of [its] problem," said U.S. Rep. Robert Portman (R-Ohio), co-chairman of the National Commission on Restructuring the IRS. It is also the first time the agency has floated an outsourcing proposal.

TIME CRUNCH

Despite the approach of 2000, the more controversial part of the IRS technology plan — which was devised in accordance with a congressional mandate issued last year — is the required outsourcing study. The IRS expects it will take a year just to issue a preliminary request for information and evaluate the responses.

Even if the agency launched an outsourcing study tomorrow, IRS officials said, substantial work by private contractors couldn't begin before 2001. And that plan would have to include safeguards to appease critics who are wary of supplying personal tax data to nongovernment workers.

> **"This is the first time we've gotten a clear indication from the IRS as to the extent of [its] problem."**
> **– U.S. Rep. Robert Portman (R-Ohio)**

The agency's first priorities are to find a quicker, interim solution to deal with its data-input and remittance-processing systems and address year 2000 compliance. The goal is to have a pilot program operating by year's end and fully implemented by December 1998 — well before 2000.

The IRS envisions implementing a system of networked PCs connected to dual file servers for manual data entry of paper tax forms. The system would cost $114 million for a 10-year useful life. If data entry is outsourced, those PCs could be used for customer service, according to an IRS report titled "Study of the Feasibility of Outsourcing Submissions Processing," which was sent to Congress last month.

The move to investigate outsourcing follows years of criticism from Congress, the General Accounting Office and others that the IRS has squandered hundreds of millions of dollars trying to upgrade its technology.

"I am certain there are millions of dollars that can be saved. Why they never did this before is beyond my mortal comprehension," said Linda Cohen, a research director at Gartner Group, Inc. in Stamford, Conn.

During recent hearings of the National Commission on Restructuring the IRS, agency Chief Information Officer Arthur Gross acknowledged technology failings at the IRS and questioned if the agency had the expertise to develop a full modernization system in-house.

"They don't have much in the way of technical knowledge within IRS, which is why they're in so much trouble," said Robert Clagett, a former AT&T Corp. executive who chaired a National Research Council Committee to Review the Tax Systems Modernization of the IRS. "I am very concerned about how they [will be] able to manage an outsider doing the job."

WISH LIST

The IRS proposal would encourage the use of imaging and intelligent character recognition by outsourcers, but such technology wouldn't be required.

Private contractors would be asked to devise systems that could handle electronic filings — which now represent just 13% of all tax returns processed — magnetic media and other methods. The IRS processes more than 200 million returns and collects $1.4 trillion in tax revenue.

Agency critics said the IRS hasn't adequately promoted electronic filings, which would cut processing costs and errors. Taxpayers must now pay extra to file electronically even though it is easier and less expensive for the IRS to handle such data.

"The IRS should pay the taxpayer to file electronically," said Neil Stillman, deputy CIO at the Department of Health and Human Services. "It sounds like they're trying to outsource something they have yet to reengineer."

Entering tax-return data is "one of the things they're good at," Clagett said. "It's such a complete white flag on giving up on the one thing that they can do; I am disappointed."

Proponents of outsourcing said it would give the government quicker access to new technologies because private firms have greater flexibility in making capital investments.

It's a big job: Can IRS CIO handle it?

Is it possible that private contractors could successfully handle such a massive, complex and sensitive project as the data entry for 200 million federal tax returns worth $1.4 trillion?

That's the proposal on the table at the IRS. Detractors note the IRS' dismal record in purchasing, developing and managing technology thus far. But supporters point not only to successful private-sector outsourcing, but also to the man likely to head any such effort within the IRS: CIO Arthur Gross.

Gross oversaw the launch of a similar project at the New York State Department of Taxation and Finance before joining the IRS last March.

"I think he's doing a tremendous job," said Rep. Robert Portman (R-Ohio), co-chairman of the National Commission on Restructuring the IRS and a strong critic of previous IRS technology spending.

Under Gross, New York projected it would save [illegible] million through a 10-year outsourcing deal with Fleet Financial Group for tax-return data entry. That project, 2 years old, is being phased in over time, so return-on-investment figures aren't yet available.

The big question is whether the technology-plagued IRS can properly manage a massive outsourcing proposal. A simpler [illegible] million Cyberfile electronic-filing project is "an example of a small acquisition they did horrifically," said Rona Stillman, chief scientist of computers and telecommunications at the General Accounting Office. "They're going to need disciplined, controlled acquisition practices."

Also possible is a political firestorm over sending taxpayers' sensitive financial information to outside workers.

"It's not a very good idea," said Marc Rotenberg, director of the Electronic Privacy Information Center in Washington. He said he doubts a contract designed to save money will apply the necessary diligence to ensure data privacy.

Outsourcing proponents argue that Americans are already dealing with having sensitive financial data handled by outsourcing firms. For example, the processing of credit-card bills is done by third parties, not American Express Co. or Visa International, Inc. They also note that the government already trusts outside companies with critical national security issues.
— Sharon Machlis

IRS OUTSOURCING PLAN

Pros:

- **Potential to improve speed and accuracy of data input**
- **Faster access to new technologies**
- **Capital costs shift to private sector**

Cons:

- **Concern over confidentiality of tax returns**
- **Need to monitor outsourcers' work**
- **Project is massive and complex**

AT&T offers on-demand bandwidth

By Kim Girard
WASHINGTON

AT&T CORP. last week offered the industry's first switched virtual circuits (SVC) for Asynchronous Transfer Mode (ATM) networks, enabling users to expand bandwidth on demand.

SVCs for ATM, announced last week at ComNet here, are available now at speeds as fast as T3 (45M bit/sec.). SVCs enable network administrators to set up temporary links to any user on the network. Unlike permanent virtual circuits (PVC), which are full-time connections, SVCs offer on-demand bandwidth with usage-based pricing.

"[SVCs] are clearly a step in the right direction," said Chuck Rush, global network architect at McDonald's Corp. in Oak Brook, Ill. "We wanted to get [SVCs] with frame relay, but we never made it there. We think that's the way to go."

PRICE-CONSCIOUS

But one analyst said AT&T's pricing wasn't aggressive enough to lure customers.

"SVCs are something the customer wants, but the carrier can't deliver it cost-effectively," said Steve Sazegari, a principal at Tele.Mac, a consultancy in Foster City, Calif. Sazegari said users will shift from PVCs to SVCs more often as pricing becomes more competitive. "At lower speeds, [SVCs] are 10 times more expensive than a dedicated line," he said.

Rush, who is rolling out a nationwide ATM network, said SVCs could be useful for client/server applications that require additional bandwidth for five or 10 minutes a day.

But Rush said he wants to learn more about AT&T's pricing for T3 speeds. To determine potential cost savings from using SVCs to connect sites, users must compare their monthly PVC charge with the per-minute cost of SVCs at the same speed.

Pricing for SVC speeds faster than 10M bit/sec. are negotiated case by case, AT&T said.

Periodical postage paid at Framingham, Mass., and other mailing offices. Posted under Canadian International Publication agreement #0283657. Computerworld (ISSN 0010-4841) is published weekly except a single combined issue for the last two weeks in December by Computerworld, Inc., 500 Old Connecticut Path, Box 9171, Framingham, Mass. 01701-9171. Copyright 1997 by Computerworld, Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed. Back issues, if available, may be purchased from the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by Computerworld, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, Computerworld, Inc., 500 Old Connecticut Path, Box 9171, Framingham, Mass. 01701-9171. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $3 a copy. U.S. — $48 a year; Canada — $110 a year; Central & So. America — $150 (surface) a year; Europe — $295 a year; all other countries — $295 a year. Subscriptions call toll free (800) 669-1002. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Box 2044, Marion, OH 43305.

Microsoft SQL Server

thinks you should
consider
spending a couple million
on your data warehouse.

(Then reject that idea, chuckle heartily to yourself
and come visit our Web site.)

Address http://www.microsoft.com/sql/

There are a couple of things that make Microsoft® SQL Server™ the smartest foundation for your data warehouse solution. First is cost: a Microsoft SQL-based solution will avoid the (potentially huge) setup and administration expenses associated with the other, more complicated approaches. Second, there's the Microsoft Alliance for Data Warehousing, an association of industry leaders formed to help foster standards and ensure interoperability across products and systems. Thanks to the Alliance, you know Microsoft SQL will integrate with other products. Which in turn saves you time and trouble and, come to think of it, more money. All told, Microsoft SQL Server is the simplest, most flexible and most affordable approach to data warehousing on the market. For all the details, visit our Web site at www.microsoft.com/sql/.

Microsoft®

Where do you want to go today?® www.microsoft.com/sql/

Business Objects ESS Informatica NCR Pilot Software Platinum Praxis International Inc. SAP

©1997 Microsoft Corporation. All rights reserved. Microsoft and Where do you want to go today? are registered trademarks of Microsoft Corporation. Other company names may be the trademarks of their respective owners.

COMMENTARY

Where everybody knows your name

David Coursey

Despite what you may hear, we're entering a period of more regulation of the Internet, not less. And that's a good thing. It's time the Internet ended its Wild West phase and settled down to being more like Chicago in the 1930s. I'll be Eliot Ness.

I've been thinking about this because some friends are about to offer free E-mail accounts, accessible from their Web site, to anybody who wants one. The catch is that users must read advertising along with their mail. On the face of it, this looks like a great deal: Get your E-mail wherever you find a Web browser — and for free at that.

My friends will let anyone set up as many anonymous E-mail accounts as they want. Even if they could prevent people from getting multiple accounts, it would be in their interest to allow it. More "users" means more advertising "seen" by users. The free E-mail service — speaking only from a mercenary perspective — ought to encourage use, no matter what the consequences.

But where they see a cool public utility, I see a nasty public nuisance. Consider: My friends want 1 million users and figure 99.5% of them will be good citizens. They're probably right, but do the math: That leaves 5,000 various flavors of computer criminals and cretins unleashed with the promise that nobody will ever know their identities. And each of those people can increase his presence on the 'net simply by using more than one free E-mail account. So 5,000 bad guys can easily make themselves look like 50,000 — and who will know the difference?

That's why I'm a big proponent of removing the cloak of anonymity that pervades the 'net. Sure, on the Internet nobody knows you're a dog, but they also don't know you're a stalker, a child pornographer or a member of the Cali drug cartel. I'd like that to change.

We need a law that requires Internet service providers and online services to make an effort to verify the identity of their customers. Ideally, every account or user name would have to be linked to a master account and a human being. Online services would be required to keep user E-mail logs and transcripts for at least 30 days, allowing for the resolution of disputes and criminal investigations.

Online services need to rewrite their terms of service to make it clear that users have no expectation of privacy if a law-enforcement authority shows up with a warrant. Privacy should also be waived if it's necessary to investigate serious infractions of other parts of the service agreement — such as unsolicited pornography, password hackers, stalkers and threats. But the services should be prohibited from reading users' E-mail without proper cause.

And before you think I'm a hard-liner: Yes, there are places where anonymity makes sense. But those places should be self-contained so everyone knows what the rules are and where the privacy cloak ends.

The good news for corporate Internet customers is twofold: First, the Internet would be a safer place to surf or do business. Second, my plan would bring the rest of the world into compliance with what companies are already doing — you know who's getting E-mail accounts, and you're taking reasonable steps to prevent abuse.

Removing anonymity is one area where the rest of the online world needs to do what IS managers have done all along: Take some responsibility for users to help make the Internet a better place.

Coursey, an analyst and consultant, is editor of "coursey.com," an online newsletter available at www.coursey.com. His E-mail address is david@coursey.com.

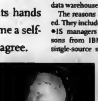
A line Microsoft can't cross

Charles Babcock

Microsoft's operating systems, applications and Internet tools continue to succeed in the market. Some people believe that with its hands around the Internet's throat, Microsoft has become a self-aggrandizing, self-perpetuating monopoly. I disagree.

Computing is too big and is moving in too many directions at once to be dominated by any one company — even one as skilled as Microsoft. The company's been pre-eminent for a decade, but its profits have reflected that influence for a considerably shorter period. IBM, on the other hand, dominated for two and a half decades, engaging in some well-documented, ruthless competitive practices and enjoying the profits for much of that period.

And what good is it to throw off one form of economic oppression for another? Hasn't Microsoft set its sights on dominating the LAN and the development of applications for the Internet? Doesn't it aspire to offer a corporate database management system as well as the operating system? Isn't it trying to move beyond the desktop? And what's to prevent it from doing so?



Microsoft will do so in some measure, no doubt. But I question whether it can move upward at will.

I believe there's a consensus at most organizations that there's a line that Microsoft shouldn't cross. It's an invisible line. It may even be shifting. But some IS managers think Microsoft should get to the application server and the file and print server — and stop.

"We looked at becoming an all-Microsoft shop, but we decided we're not going to do that," is a comment I heard recently. Granted, it was an IS manager speaking, and IS managers are sometimes driven by the wishes of business managers and end users. But no one I've talked to wants an enterprise based on Microsoft dominance from the desktop to the data warehouse.

The reasons are several and interrelated. They include the following:

- IS managers learned some hard lessons from IBM about the dangers of single-source suppliers. Having fought clear of that influence, nobody wants to exchange one form of technical dominance for another.
- Despite some adroit maneuvering on the Internet, Microsoft's instincts still lie on the desktop. Its big systems competitors, except Digital, are tacitly united in pushing large systems technology whenever and wherever they can take advantage of a Microsoft weakness. They have fought Microsoft to a standoff on the object-oriented front through the Common Object Request Broker Architecture standard, and they united behind Java before its usefulness was clear. Java, with its more network-centric form of computing, brought together former bitter competitors Sun, Oracle, IBM and Netscape, forming an alternative to Microsoft's dominion.
- Microsoft aspires to grow in the database, networking and groupware arenas, but the competition is proving tougher than anticipated. In each of those areas, Microsoft faces companies that made their reputations for a core competency. Pushing them aside has proved difficult. Novell is making something of a comeback. Lotus has proved it can adapt and continue to sell Notes. And Oracle and Informix are so competitive with each other that Microsoft will have a hard time catching up.

I think IS departments once resigned themselves to greater Microsoft dominance, even though they knew of the egocentric nature of the company. Now they have examples of non-Microsoft technologies succeeding and of Microsoft competitors getting their second wind.

Given a choice, they'll make one that limits their dependence on Microsoft to the area where they accept its leadership and competence: the desktop.

Babcock is Computerworld*'s technical editor. His Internet address is charles_babcock@cw.com.*

The Back Page

alt.cw

Dispatches & images from the fringes of the electronic frontier

PULL UP! YOU'RE OVER BUDGET!

How do you learn to manage software projects without risking your career on actual projects? Try the VX-1 Basic Software Project Management Simulator from Virtual Experience in Washington. Just as flight simulators are used to train pilots, this Windows courseware takes the user safely through a year's worth of project snafus in as little as four to five days. Pricing for the software starts at $350. – Robert L. Scheier

Web watchbary

Soon there will be business applications for "Web cams," video cameras that show World Wide Web browsers what's happening inside or outside a building.

In the meantime, one of the best collections of first-generation Web cams is at EarthCam (www.earthcam.com). There you'll find links to dozens of Web cams, including the following gems:

- The beach at Venice, Calif.
- Inside the office of former MTV veejay Adam Curry.
- Laundromat machines in action.
- A bird's-eye view of Todtmoos, a quaint village in Germany.
- A Dunkin Donuts shop in Garfield, N.J.
- Inside a cybercafe in Paris.
- Main Street at Disney World.

Buzzwords

- **404: Someone who's clueless. Derived from the Web message, "404 not found."**
- **Link rot: The process by which links on a Web page become outdated because the linked site changes location or dies.**
- **PEBCAK: Help desk shorthand for "Problem exists between chair and keyboard."**
- **Webumentary: A nonlinear, multimedia documentary on the Web.**

Sources: Wired, San Francisco; Hajjar and Partners, Marina Del Rey, Calif.

DID YOU KNOW lettuce is 97% water? Or that the human brain is 75% water? You would know your water facts if you visited AquaPenn Spring Water Co.'s Web page (www.aquapenn.com). Your host for a tour of the squeaky-clean world of bottled water is cartoon character Water Dewd.

THE U.S. AT YEAR'S END 1996 has a "computer density" of 40 computers per 100 people, with PCs accounting for 38 of those computers, according to the latest edition of the *Computer Industry Almanac*, published in Glenbrook, Nev. The U.S. computer density is expected to grow to 58 computers per 100 people by the end of 2000, according to the almanac.

- Send your alt cw contributions to **mbetts@cw.com.** If your item is used, you'll receive a cool T-shirt

Inside Lines

Abort, Retry or Fail this!

If you've decided that you and your PC have irreconcilable differences, find your way to members.aol.com/spoon2000/break/, where you'll find Tom Murphy's "Illustrated Guide to Breaking Your Computer." It expounds on the joys of partitioning your hard drive with a hacksaw and the effect of a pocket blowtorch on circuit boards.

Beaten by the clock

Oracle recently had to call off its PR dogs. A long-promised announcement of Windows NT data-mart packages was scheduled to take place at a data warehousing conference two weeks from now. The clock struck midnight on the plans after Oracle couldn't wrap up a licensing deal for third-party data extraction tools in time to make the announcement feasible. Sources said Oracle is talking closely with Sagent Technology, a Menlo Park, Calif., company that makes tools for Windows NT data marts. Oracle is now shooting for March.

Unix vendors are all too modest

Considering all the hype Windows NT generates these days, one would think Unix vendors would be dying for some ink. But apparently not some folks at SCO and Hewlett-Packard. Both companies this week are slated to announce 32- and 64-bit application programming interfaces for the next-generation 3DA Unix operating system. But far from wanting to talk about the interfaces, representatives from both companies seemed more intent on convincing us just how inconsequential the announcements really are. "It's not like its anything earth-shattering, you know," said one spokesman. "It's not a big deal, really!" said the other. If only Microsoft were this bashful!

Eat your heart out, Larry Ellison

SAP Vice Chairman Hasso Plattner, one of the Oracle chief's key rivals on the software applications front and high seas, sailed off with first place and a new record in the recent Sydney to Hobart Ocean Classic off the coast of Australia. Plattner served as skipper of his 80-foot yacht, Morning Glory, and finished the race in two days, four hours, seven minutes and 10 seconds.

Dust off that resume

A networks designer at Boeing last week told fellow ComNet attendees the company will face major headaches if it tries to integrate its networks with those at McDonnell Douglas, Boeing's $13 billion acquisition. For one thing, the two use completely different networking schemes. Luckily, the designer said, the companies can't officially begin integration work until the merger is final, which probably will be this summer. "Hopefully, I'll be on another assignment" by then, he said. Of course, if we printed his name, we could pretty much guarantee that.

Who said Ebonics is the only kind of nonstandard English. Watch for these telltale signs that your children are learning Dweebonics:

10. They tilt their head sideways to smile.

9. When you ground them, they say, "Your UI could really use some work."

8. They say, "My dad can beat your dad at Quake."

7 Instead of laughing, they say, "LOL."

6 They insult kids by saying, "And you've got limited bandwidth!"

5. They change the answering machine message to "BRB, leave your URL, and we'll TTYL."

4 This is how they ask someone out on a date: "Umm, uh, well . . . see ya!"

3 Calling from camp, your homesick child says, "I'm roaming outside my service area!"

2 When you ask if they've finished their book report, they say, "It's in beta, but it'll ship in time."

1. You're telling them something they don't want to hear. They're saying, "NAK, NAK, NAK" the whole time.

News editor Patricia Keefe doesn't care what language you speak. Send your news tips to her at (508) 820-8130 or patricia_keefe @cw.com.

DATA WAREHOUSING WITHOUT A GOOD PLAN CAN GET REAL UGLY.

In the rush to implement functional data warehousing, many companies have instead created one dysfunctional patchworked database. Which ultimately leads to nothing but pain.

Cayenne has a somewhat more sane solution. A set of tools that allow you to extract your existing data structures by reverse engineering them into logical business models, and then forward engineering them into a physical warehouse design.

This is not some medieval CASE model. It's an adaptable, fluid architecture that lets you stay on top of the meta data, so you can evolve and update across the enterprise as data query and analysis requirements change.

Don't let your data warehouse become another horror story.

Call us at 1-800-285-7294 or visit our web site, www.cayennesoft.com, for a white paper on data warehousing architecture.

KEEP DATA WAREHOUSING BEAUTIFUL.

Please send me your guide "Data Warehousing: A Fluid Architecture."

Name ____________________

Title ____________________ Company ____________________

Address ____________________

City ____________________ State ____________________ Zip ____________________

Tel ____________________ E-mail ____________________

1-800-285-7294 Fax: 617-229-9904
www.cayennesoft.com
Cayenne Software Inc., 8 New England Executive Park, Burlington, MA 01803

Cayenne
SOFTWARE, INC
A Bachman and Cadre Company

Cayenne is a trademark of Cayenne Software Inc. Boris Karloff licensed by Karloff Enterprises. Represented by The Roger Richman Agency, Inc. Beverly Hills, CA 90212.

Internet **Forté Integrates** SAP
IIOP **Anything** Baan
PeopleSoft **With** CORBA
ActiveX **Everything** DCE

LEGACY

OBJECTS

The Forté Application Environment™ protects your investments in *both* hardware and software. We go beyond simple portability across desktop browsers and GUIs, open-system servers, and RDBMSs. We incorporate the major communication technologies, including Internet, ActiveX, CORBA, IIOP and DCE. This lets us integrate with application packages such as SAP, Baan and PeopleSoft, as well as with custom-built legacy applications.

Nobody but Forté lets you develop enterprise-wide applications as if they were to run on a single computer, and then automatically and dynamically distribute them across your heterogeneous *hardware* environment while integrating with your heterogeneous *software* environment. Which explains why we're the fastest growing systems software company ever.

Want to just plain stop those internal discussions of Microsoft vs. Oracle vs. Netscape? With Forté, it doesn't matter. Find out more via the Web. Or call 800-90FORTE (800-903-6783), today.

Microsoft Oracle Netscape

FORTÉ

www.forte.com/cw

©1997 Forté Software, Inc. Forté is a registered trademark and Forté Application Environment and the Forté logo are trademarks of Forté Software, Inc. From outside the US call 510-869-3400. All other trademarks acknowledged.

TRBA